A CHILTON PUBLICATION

the Iron Age

E NATIONAL METALWORKING WEEKLY

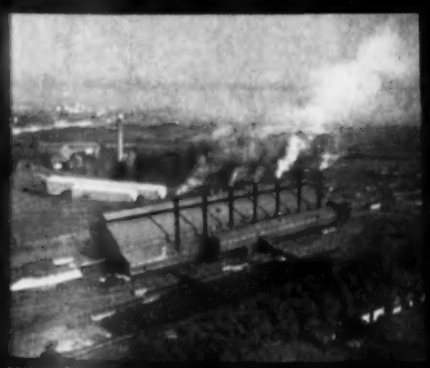
December 24, 1953

ENTS PAGE 2

IRON OR STEEL PRODUCING PLANTS OF CF&I

PUEBLO PLANT—PUEBLO, COLORADO

BUFFALO PLANT—BUFFALO, NEW YORK



CLAYMONT PLANT—CLAYMONT, DELAWARE

ROEBLING PLANT—ROEBLING, NEW JERSEY

E & G BROOKE PLANT—BIRDSBORO, PENNSYLVANIA

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for steel and steel products

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John A. Roebling's Sons Corporation, Trenton, N. J.
Wickwire Spencer Steel Division, New York, N. Y.

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Claymont, Delaware	Pueblo, Colorado
Clinton, Massachusetts	So. San Francisco, Calif.
Mt. Wolf, Pennsylvania	Trenton, New Jersey
Oakland, California	Worcester, Massachusetts

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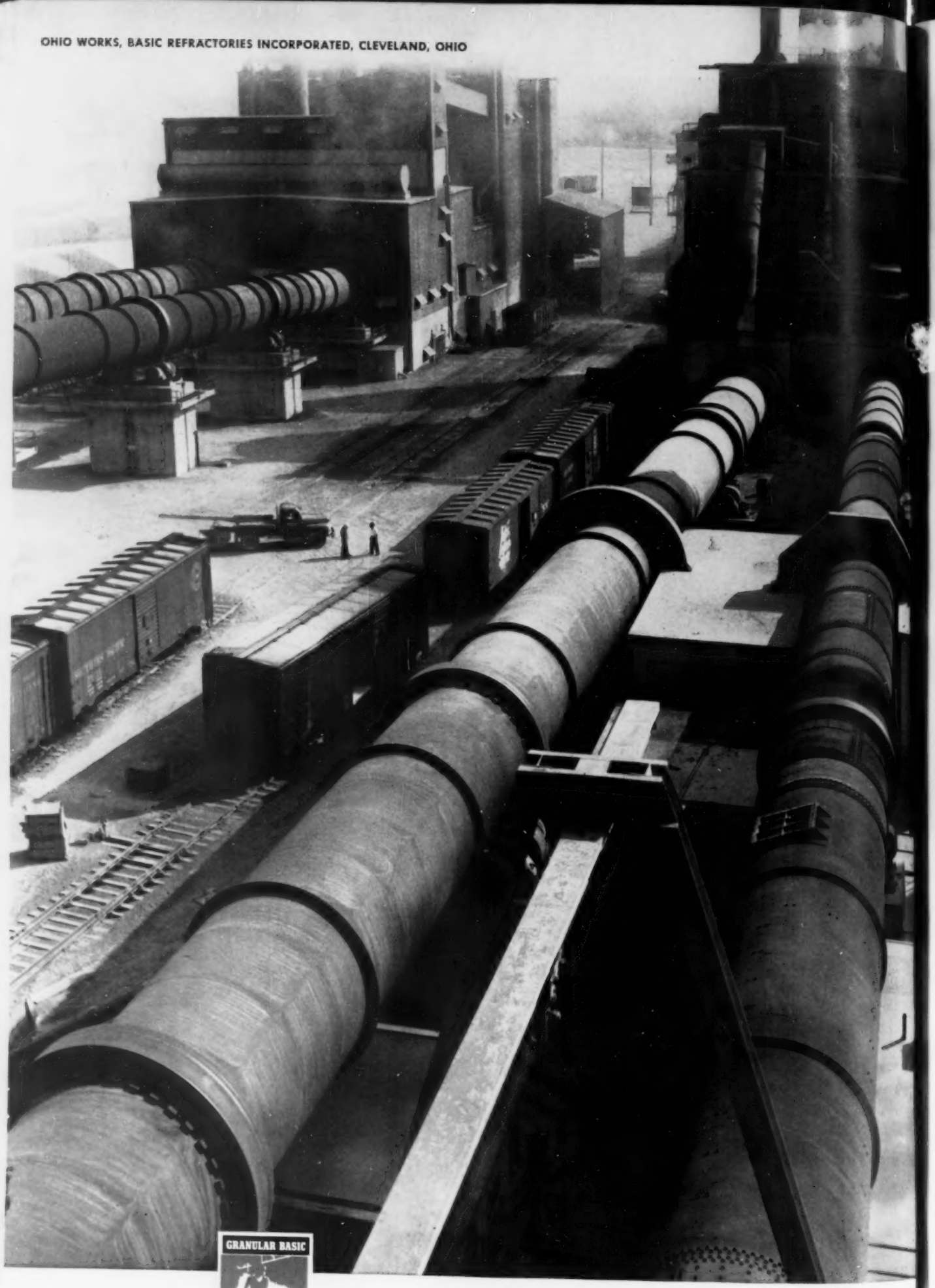
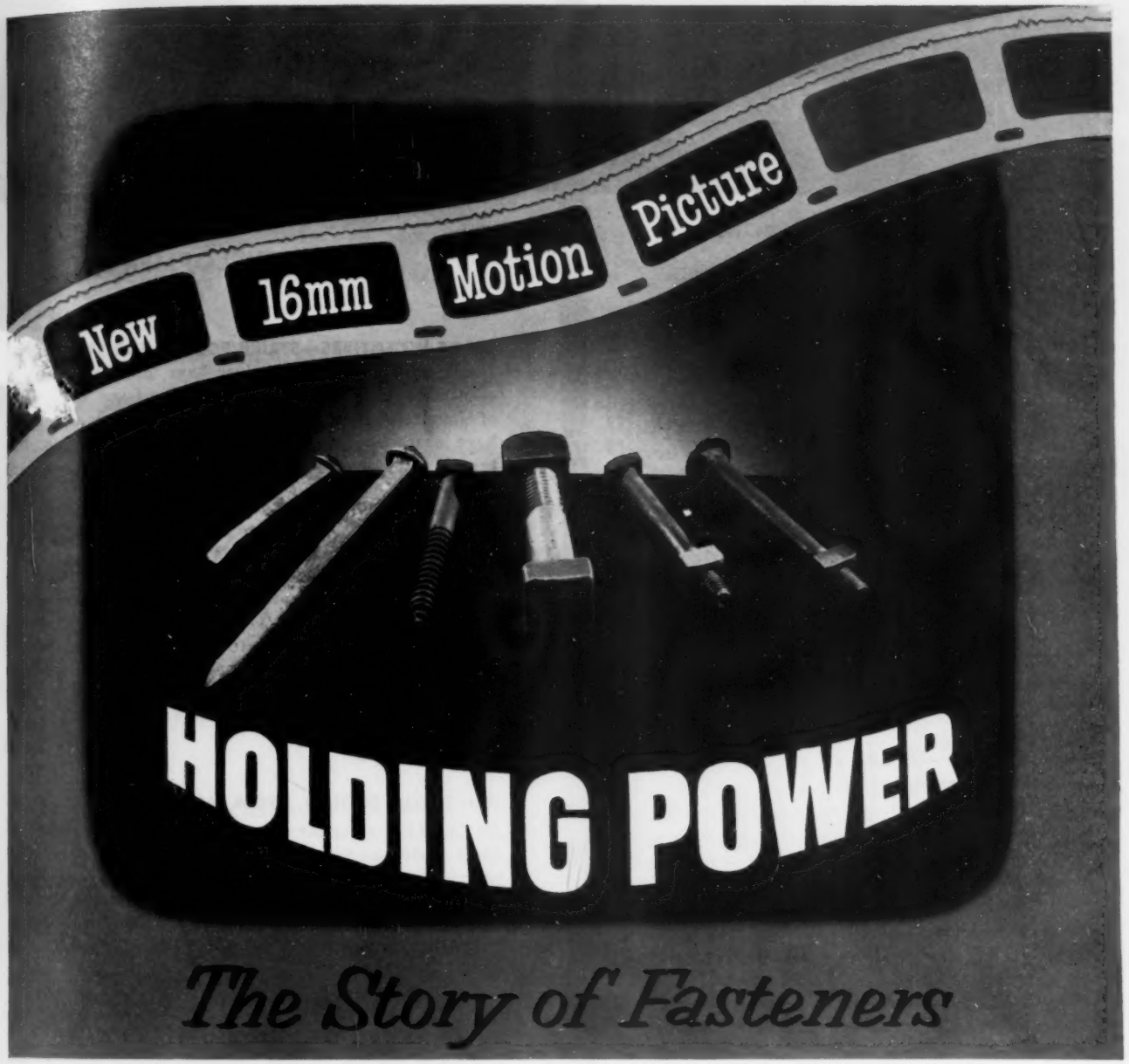


GRANULAR BASIC

REFRACTORIES

"A good Workman is Known by His Tools"



This important new film dramatizes the story of fasteners. It delves into such common, everyday items as machine bolts, nuts, rivets, track bolts and spikes, and also describes roof bolts, high-strength bolts, oil-well sucker rods, and a wide range of special fasteners. The film takes you behind the scenes in our modern fastener plants. It shows how fasteners are made, and explains the vital part they are playing in industry.

"Holding Power" is in color, with sound. It is on 16mm film, and has a running time of approximately 30 minutes.

"Holding Power" is an ideal film for showing to distributors, consumers, and others closely associated with fasteners. It is also an interesting, highly educational picture for general audiences. There is no charge, except for the return postage. If you would like a print for showing, fill out the coupon, selecting a date well in advance, and mail it to Publications Department, Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

Gentlemen:

Please send me a print of your new film, "Holding Power." I will return it promptly, paying return postage.

Approximate date wanted_____

Send Print to This Address_____

Name of Company or Organization_____

MY-14 Signature_____

The Iron Age

Vol. 172, No. 26, December 24, 1953

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DIGEST of

NEWS DEVELOPMENTS

WAGE INCENTIVES—STRIKE SOURCE FOR STEEL—P. 17
Disputes over wage incentives have long been a source of strikes in the steel industry. The issue is the root of hundreds of grievances. Both industry and union have searched for a mutually equitable solution. But there's fundamental disagreement in some important areas. Here are arguments of both sides.

ENGINEERS QUIZ LIGHT METAL FOUNDRYMEN — P. 20
What do engineers want to know about aluminum and magnesium castings? A Chicago sand foundry offered to brief 15 engineers, scheduled a one-night stand for the quiz. It had to be expanded to eight sessions, then it went on the road. Show is so solid it may be filmed. Here are questions, answers.

WHAT YOU SHOULD KNOW ABOUT BONUSES—P. 25
As the 1953 calendar runs out, employers should recheck their policies on bonuses and compare them with current labor and tax laws. As an aid to management, National Foundry Assn. has outlined the problem and given plants some of the answers. Remember Jan. 1 is the deadline for Fair Labor Standards compliance.

AUTO JOB OUTLOOK TEMPERS XMAS CHEER — P. 36
Auto workers are viewing the post-holiday season with mixed emotions. Industry employment and payrolls set new records in 1953, but end-of-year unemployment was the highest in 15 months in Michigan. For some, a holiday layoff will be followed by first period overtime, but others aren't sure when they'd be recalled.

IKE, CONGRESS AGREE ON SOME TAX CUTS — P. 41
Although the main points in President Eisenhower's forthcoming tax program are well-guarded secrets, it is now apparent that agreement has been reached on a number of lesser points. Double taxation of corporate dividends, for example, is to be cleared up—but only to a limited extent.

AUTOMATION: IT'S MORE THAN A PUSHBUTTON—P. 47
Automatic production does not mean that management can sit back after pushing the "start" button. A number of caution signals were flashed at the recent American Society of Mechanical Engineers' meeting. Management will be confronted with many psychological and mechanical problems.

the Week in Metalworking

ENGINEERING & PRODUCTION

LOW FREQUENCY INDUCTION HEATING GROWS—P. 69
Use of low frequency induction heating equipment for ferrous and nonferrous applications is growing. Penetration of heat energy is greater than with high frequency heating. The 3-phase heater draws a balanced load from the electrical circuit. Accurate, uniform temperatures help improve quality of metal products.

BETTER SETUPS FINISH DIECASTING FASTER—P. 73
Diecasting machines operating in a department of their own can produce a variety of parts with economy and efficiency. Supervision and quality control is better when handled within the department. Presses do trimming and shaving, tumbling removes light flash and burrs. Costs have been reduced.

AL COATING PROTECTS CAST IRON COOLERS—P. 76
A mixture of aluminum powder with a special plastic vehicle is used to protect cast iron condenser coils. Cost of the coating is less than one cleaning operation. Test coatings of this material have an operating history of 3 years in contaminated salt water. Effectiveness has been proved on outdoor structurals.

NEW NICKEL PLATING PROCESS IS FASTER — P. 78
A new bright-nickel plating process has reduced costs, increased output and produced brighter deposits. Bath has good leveling properties, requiring no polishing or buffing before plating. Good ductility and low internal stress of deposit eliminates cracking and crazing. Heat and power costs are down.

HOW TO INCREASE SCREW MACHINE OUTPUT—P. 82
Close attention to machine design, tool design and tool lubrication will pay off in much faster screw machine output, better tool life, lower costs. Cone Automatic Machine Co. proved this in a series of studies using carbide tools at high speeds. Problems of chatter, poor finish, heat and tool wear can be licked.

NEXT WEEK—HOT OIL QUENCHING TOUGHENS PARTS
Tractor shovels, by repeated back and forth movement in service, subject gears and other parts to intermittent peak stress loads. To meet these conditions, the parts are quenched in 300°F oil after carburizing. Sliding parts receive a thin, hard case by dry cyaniding. Production has been increased, costs have been cut.

MARKETS & PRICES

CAN YOU USE NEW LONG-LASTING BATTERY?—P. 19
After 4 years of military service, sintered plate nickel-cadmium batteries will now also serve the civilian market. Sonotone and its licensees will go into production on the long-lasting cell. While the price tag may be two to five times as high as on present types, 10 to 20 year life will compensate for cost.

NEW NICKEL RECOVERY PROCESSES HELP OUT — P. 21
GSA has recommended to ODM that no more fast tax write-offs be granted on nickel refining capacity until new technical developments become clearer. Reason is that new recovery processes may completely change the outlook for future supplies. But these will not help short term procurement of nickel consumers.

TRICK DEALS DENT STEEL POOL SPIRIT — P. 22
European Coal Steel Community is suffering considerable embarrassment because of antics by some exporters and producers in the family. Reasons: (1) Pool producers are selling below official list prices, and (2) Exporters in ECSC have for some time been running a steel export price-fixing cartel.

DROP FORGING REBOUNDS AFTER FALL DIP — P. 27
With December bookings on the upswing, the drop forging industry was rebounding after an early fall slump. Dollar value of 1953 shipments is expected to top 1952. But next year may see a slight slip in output. Auto cutbacks, inventory curbing were partly to blame for the fall dip. Forgers brace for competition.

STEEL BUSINESS FOLLOWS SEASONAL PATTERNS—P. 91
The steel market is more closely following seasonal patterns than at any time since before World War II. It is estimated that the operating rate will sink 10 to 15 points this week as producers use the Holidays to get operations realigned with orders. Move up of Fisher Body orders will help some January books.

KENNECOTT BUYS INTO KAISER ALUMINUM — P. 94
Spreading its investment eggs into more baskets, Kennecott Copper Corp. announced purchase of $16.25 million worth of Kaiser Aluminum preferred and 100,000 shares of common stock. This deal completes Kaiser's equity financing for the $230 million expansion and construction program begun in 1951.

JEFFREY cast pulleys are better

Jeffrey Cast Iron Pulleys insure the most efficient and economical belt conveyor operation because:

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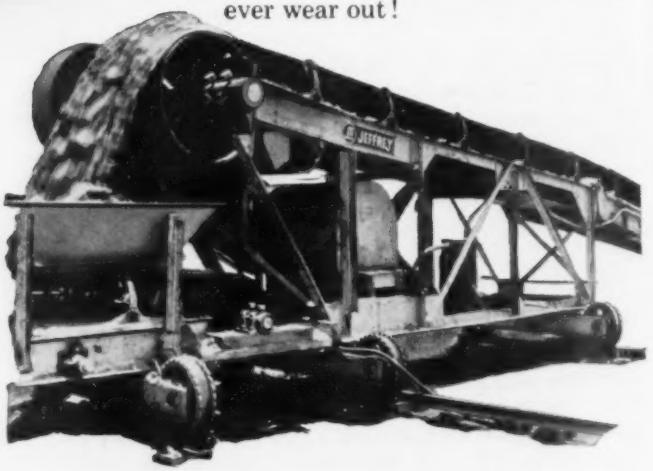

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Indexed in the Industrial Arts Index and the Engineering Index.

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Controlled Circulation Audit

National Business Publications

Industrial Security Is A Must

THIS is the age when your enemies must never get the drop on you. This is the age too when American industry as never before must spend more time on security problems in its plants.

There never will be a chance for peace unless and until this country leads from strength. That strength depends on industry and its part in the defense program. But that strength can be weakened if spies, fellow-travelers and plain stupid blabbermouths are allowed to know about top military secrets.

It is true that government regulations on just how a plant may be made secure and just how employees should be screened leave a lot to be desired. But that is no excuse to let friends of the Communists into defense plants. One way to clear up the security problem is to assign a high-ranking official to contact the proper governmental agencies in a drive to simplify and clarify the screening of employees working on military orders of a secret nature.

The recent action of General Electric Co. in suspending all employees who hide behind the Fifth Amendment took courage. There is no doubt that this great company will be vilified and castigated by the lunatic fringe which appears to list its allegiance to America at the bottom—if at all. And we can expect the Communists and their fellow travelers to make a lot of noise over G.E.'s action.

Despite the most thorough checking there are bound to be cases where undesirables get into plants working on top military orders. Screening employees for such work is only the beginning. There should be a continuing scrutiny if industrial firms are to be spared the embarrassment of seeing some of their people publicly branded as either Communists or poor security risks.

Make no mistake about it—the public will not tolerate the employment of Communists or fellow travelers in jobs that guard the security of the United States. Excuses and explanations will not be sufficient. There is no reason for witch hunts—but there is plenty of reason for feeling that defense work for the government should be protected at all costs.

The Communists will spare neither costs nor people to get what they want. This is not cloak and dagger fantasy—it is the bitter truth. So make plant security a No. 1 priority for your company.

Tom Campbell

Editor

"AUTOMATIC THREADING" for Automatic Chucking Machines

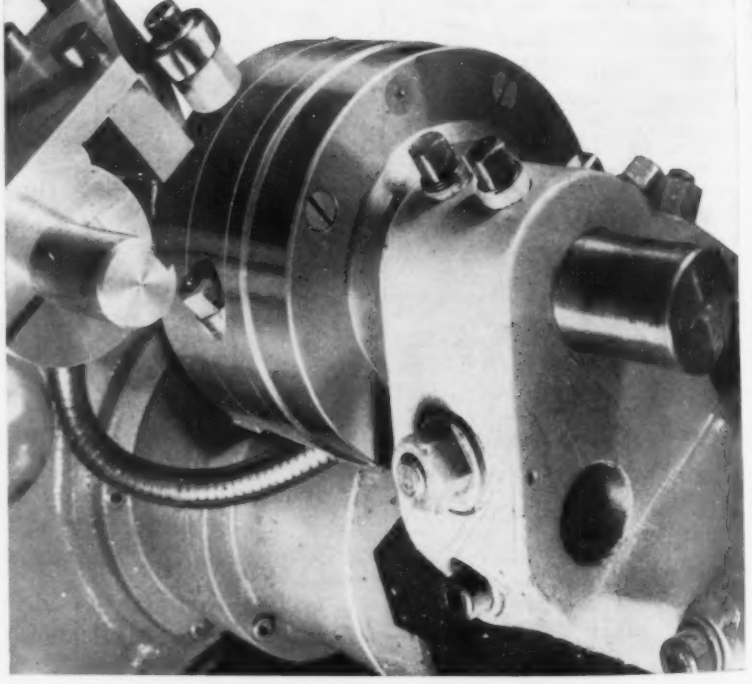
The adaptability of Landis Heads is once again proven by this application of a LANDMATIC Head on a #1AC Warner & Swasey Automatic Chucking Machine. Normally, the LANDMATIC is applied to turret lathes and while self-opening, it is closed manually. To adapt this stationary head for automatic operation on the Automatic Chucking Machine, only two steps were required: (1) —the addition of a closing roller in place of the handle and (2)—the use of special closing pins which provide overtravel, eliminating the need of a complicated, accurately-set closing cam.

This adaptability has paid off for the S&C Electric Company, Chicago, Illinois, manufacturers of high voltage protective equipment.

Besides a completely automatic threading operation, this head, through the use of long life tangential chasers, offers lower tool cost and less down time. For example—when threading the workpiece shown, a contact ferrule of 85-5-5-5 cast red brass requiring a 1⅜"—16 Pitch UN thread ⅜" long into a 1/16" relief, complete runs of over 3000 pieces are made without grinding the chasers.

Another outstanding feature of LANDMATIC Heat-Treated Heads is their wide range coverage and oversize capacity. The 2" Head, illustrated here, will normally thread all diameters ranging from ⅜" to 2". Using oversize chaser holders, its range can be increased to thread up to 3¾" in diameter.

For more complete information on LANDIS Heat-Treated Heads for rotary or stationary applications, straight or tapered threading, ask for Bulletin F-90. Please send specifications when writing.



LANDIS *Machine* CO. 50th ANNIVERSARY WAYNESBORO PENNSYLVANIA

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Dear Editor:

Letters from readers

Uniterm Index

Sir:

In your Nov. 5 issue, a Newsfront item mentioned a new method of indexing technical information being tested by the Armed Services Technical Information Agency.

We are very interested in this and would appreciate more complete information from you on this subject, or if this is not possible, could you give us the address of the agency so that we can request it from them.

B. W. AHLSON
Chief Draftsman
Goodman Mfg. Co.
Chicago

We suggest you write Armed Services Technical Information Agency, Lafayette Building, Washington 25, D. C., for a copy of the "Installation Manual for the Uniterm System of Coordinate Indexing." It was prepared by Documentation Inc. under Contract AF 18(600)-376 and published by Document Service Center, Knott Building, Dayton 2, Ohio. This manual describes the Uniterm System of Coordinate Indexing and contain instructions for its installation and use.

If you want a full description of the Uniterm System theory, a book has been published on the basis of technical reports evolving from the ASTIA research program: "Studies in Coordinate Indexing," by Mortimer Taube & Associates, published by and available from Documentation Inc. 2521 Connecticut Ave., N. W., Washington, D. C.—Ed.

Rental Operation

Sir:

My attention was called recently to an article that was published in the Aug. 31, 1950 issue of IRON AGE. The title of this was "You Can Rent It For Less," by John Anthony. I believe this article was a discription of the rental operations of the Rentco Co. I am wondering if it would be possible to get a copy of this article.

ARTHUR STEVENS
The Vendo Co.
Kansas City, Mo.

Out of 6000 reprints there are just 13 left.—Ed.

Holding Power

Sir:

Your article "Shrink Fits: Holding Power Can Be Increased," by Bernard Trock, was very interesting and informative. I would appreciate receiving a copy of the article if it is available.

R. E. MOULTON
Manager
Fabrication Services
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, Calif.

Ultrasonic Vibrations

Sir:

In the Oct. 8 issue of THE IRON AGE, it is stated that aluminum is prepared for soldering through the use of ultrasonic vibrations in a recently tried British method. We will appreciate any information you can give us on this subject.

E. BAL
F. W. Sickles Div.
General Instrument Corp.
Chicopee, Mass.

Further information may be obtained by writing Mullard, Ltd., Century House, Shaftesbury Ave., London WC 2, England, the people who introduced this method.—Ed.

Cold Extrusion of Shells

Sir:

We would appreciate receiving 10 copies of the article entitled "Five-Step Cold Extrusion Line Forms 60-mm Mortar Shells" from your issue of Nov. 19, p. 147.

H. H. DREWS
Industrial Engineer
The Oliver Corp.
Springfield, Ohio

This exhausts the reprints of this article. Ed.

Wire Wrapping

Sir:

On p. 150 of the Aug. 6 IRON AGE, there is a description of a wire wrapping tool developed by Bell Telephone Laboratories and the Western Electric Co. We would like to receive additional information on this item.

M. O. BAKER
Librarian
Baker & Co., Inc.
Newark, N. J.

Further information on this tool may be obtained by writing to the Patent Licensing Division, Western Electric Co., Inc., 195 Broadway, N. Y.—Ed.

Less Burn-Through

Sir:

In the Nov. 26 issue, p. 43, you have a reference to less burn-through in welding. Would you please be good enough to give me specific information on this development? This information is sought for use in connection with our instruction program.

G. S. SCHALLER
Professor of Mechanical Engr.
University of Washington
Seattle

Further information on the new coating used on contact welding electrodes may be obtained by contacting Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing 58, L. I.—Ed.

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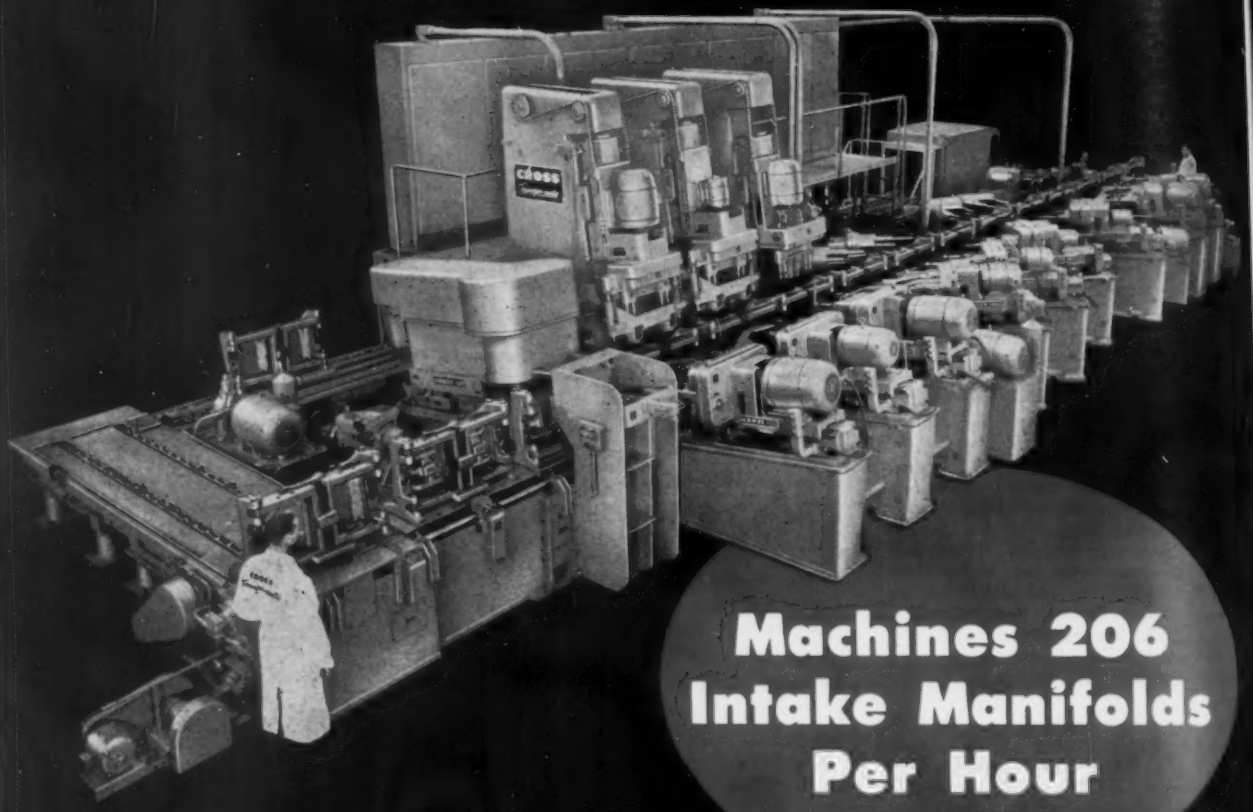

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by William M. Coffey

A Bit of History

We've always had a suspicion that when we joined THE IRON AGE we weren't just taking another job with another industrial magazine, but were joining a real American Institution, 98 years old.

The warmth and friendship shown by our subscribers seems to confirm this suspicion. Every day they write us wonderful letters—go out of their way to be nice to us. Such a friend is Charles H. Hughes, author of Hughes Handbook Ship Calculations, who in a letter says ". . . on going over my files I came across the attached copy of THE IRON AGE, *June 8, 1911*. Still think my article on page 1430 is good." Entitled "Raising the Battleship Maine," it describes with dramatic photographs an engineering feat that is still a classic. It's excellent and we'll bet the editor would be proud to print it today.

This started us wondering about the wealth of history that must be contained in old issues of your ffj. So we browsed further in the June 8, 1911, issue that Mr. Hughes so kindly sent us. We found all this —in just the one issue:

American Vanadium Co. (an old friend and now the Vanadium Corp. of America) advertises on the front cover its Vanadium Cast Steel Yoke for the Panama Canal . . . Thomas A. Edison announces on page 1381 that he has perfected a storage battery for motor cars or vehicles of any kind which can be recharged in three or four minutes and will have a life of 50 or 60 miles . . .

. . . the wreck of the Steel Steamer Vega on Lake Michigan is advertised For Sale . . . the government announces bids for six 1 million gallon pumps for Fort Mills on Corregidor.

A real "you are there" glimpse of history in the making is the transcript of the Sherman Anti-Trust investigation of the Steel Corporation. Theodore Roosevelt, J. P. Morgan, Andrew Carnegie, Judge Gary are all there. It's fascinating, so we'll let you read just a part of it. This is the testimony of John W. Gates, before the Stanley Committee:

Mr. Beall: Some time ago you said there was a fear that Mr. Carnegie would demoralize the railroad business and the tube works just as he had done the steel business as I understood it?

Mr. Gates: That was Mr. Morgan's statement.

Mr. Beall: In what way had he demoralized the steel business prior to this consolidation?

Mr. Gates: Well, in those days we used to have a few agreements. The boys would make them and Andy would kick them over.

Mr. Beall: Was Mr. Carnegie among those inclined to break those gentlemen's agreements?

Mr. Gates: I do not know anything about those gentlemen's agreements, but I know that if Frick and I would agree to one thing in the forenoon, as between our two companies, he might tell me in the afternoon that Carnegie would not stand for it. In other words, no one in the Carnegie Steel Company controlled Mr. Carnegie, but he controlled every other man in the corporation . . .

* * *

In this issue THE IRON AGE gets in its plug, too. In an ad on page 96 we read "THE IRON AGE *is read by more men of purchasing power than any other journal circulated in the metal trades. In this respect there is nothing else printed that can compare.*"

It still is, and there still isn't.

We pause in this thrilling episode to wish everybody a very . . .

MERRY CHRISTMAS

. . . keep sending the money.

New Puzzle

Hobart Ellis of Columbia University submits this one: There was once a suburbanite who rode the trains. Every day he took the same train home and his chauffeur met him at the station at 4 o'clock. One day things were dull at the office, so the man took an earlier train which brought him to his station an hour earlier than usual.

Since the chauffeur didn't know, he was not there. So the man started to walk home. When the chauffeur came along at his regular time, he met the boss on the way home, picked him up and took him home. They got there 20 minutes earlier than usual. If the chauffeur always drives at the same speed and no time is lost in waiting for the train or picking up the passengers, find the time when the chauffeur met his employer on the road.

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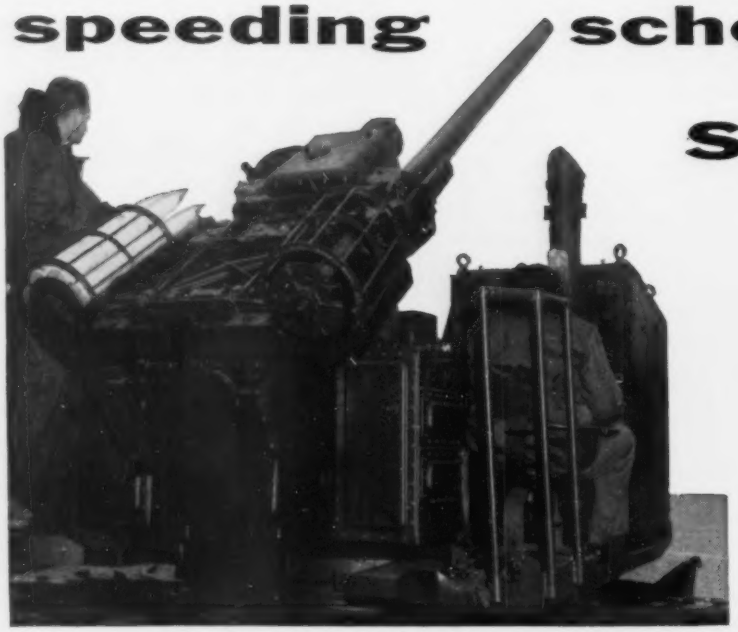
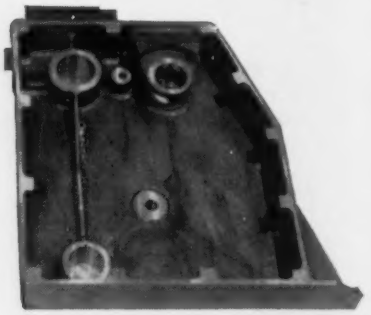


Photos courtesy of American Machine & Foundry Company.

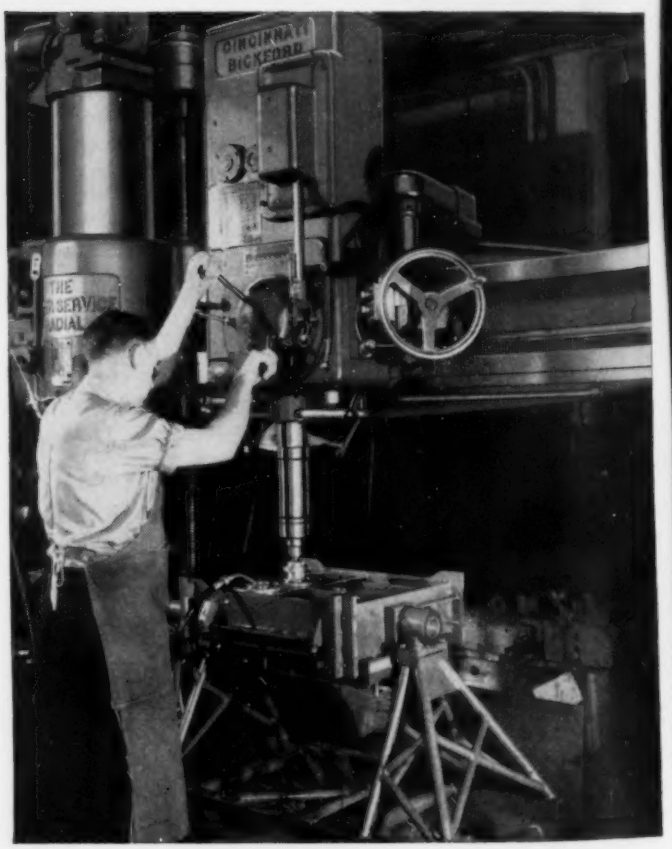


Drilling operations are performed on right and left-hand housings (steel weldments) of the U. S. Army's anti-aircraft "Skysweeper". Time was cut from 3 hours to 2½ hours, and accuracy of bore held within .0006".

The American Machine & Foundry Company states—"We like this machine not only for its performance and ease of handling but because of its flexibility of control, power and ability to stand abuse as well."

This Cincinnati Bickford Super Service Radial effected a 17% saving and speeded schedules. The machine is used to drill and tap, rough bore, finish bore, and ream.

Write for Booklet R-29



CINCINNATI BICKFORD

SUPER SERVICE RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

ENGINEERING away from metals that may quickly become scarce in a national emergency will be a major project in long range industrial planning during the next decade. Near the head of such a list are copper and nickel.

DEVELOPMENT OF A HEAT-RESISTANT PATTERN COATING and use of centrifugal casting have made it possible to produce small accurate investment castings in less than 6 hr. Plastic patterns for the process are quantity produced in an injection molding machine.

HEAVY CONSTRUCTION AND PUBLIC BUILDING programs are being relied on by some business forecasters to keep gross national product up to the 1952 level of $348 billion. If optimism is justified GNP will drop only 5 pct from this year's record rate.

STEEL BUYERS are re-examining purchasing policies to make them conform to changing market conditions. Old free-and-easy days are past. One large company is making detailed study of steel buying patterns, expects to save money by more careful selection of suppliers, more careful analysis of needs.

MORE SELLING EFFORT will be needed next year to check downward slide in tractor and other farm equipment sales, already 15 pct below last year's figures. The administration hopes to hold farm cash income close to the present $31 billion rate. But buyers will ask more often: Do I need this now?

BRITISH TITANIUM PRODUCTION by 1955 will be at the rate of 1500 tons per year or 750 tons of finished products it is reported. By government agreement, price to consumer will not be higher than world price (likely to be set by U. S. price).

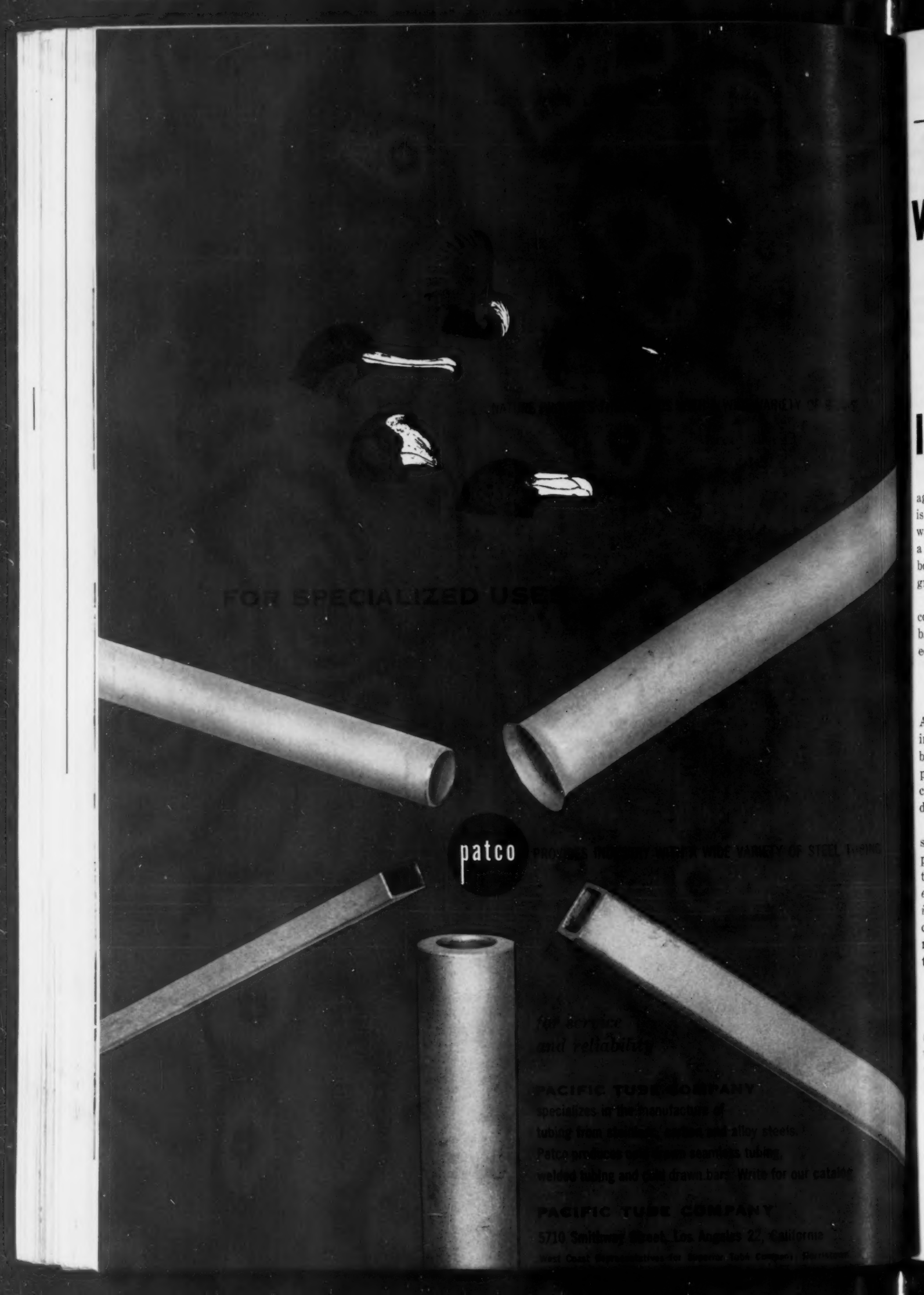
TOP QUALITY MAINTENANCE and employees alert for the smallest blaze are best bets to save your plant from fire damage, even if the building is of fireproof construction. That's the theme of a new Small Business Administration leaflet with suggestions for improving small plant fire fighting potential.

DENTAL PLASTER has been used by one aircraft company in place of poured metal as locating pads to maintain preset dimensions of certain tools. The flour-like material, doughy when mixed with water, is easy to form. When set, it withstands pressures to 11,500 lb.

USED CAR DISPOSAL PROBLEMS are not limited to dealers in U. S. autos. Dealers in foreign cars are also having troubles. One Detroit sports and foreign car dealer is reported to have over 30 1952 MG's on hand which he is having trouble moving.

LOOK FOR FREIGHT ABSORPTION trend to gather momentum in 1954, as steel producers and other manufacturers attempt to keep production volume up by broadening market areas they serve.

END OF EXCESS PROFITS TAX will mean a profit windfall for many firms--even at moderately lower levels of operation. But this windfall will be shortlived if EPT is replaced with some other form of tax, as many expect.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The Iron Age
FOUNDED 1855
News Section

Wage Incentives—Strike Source for Steel

- Disputes over wage incentives have long been a source of strikes in the steel industry. The issue is the root of hundreds of labor grievances.
- Both industry and union have been searching for a mutually equitable solution. But in some important areas there is fundamental disagreement.
- Management believes hourly wage rate is fair pay for fair day's work—but to be eligible for a bonus, worker must work harder, make more.
- Union maintains that key workers get lion's share of wage incentives while most of the other workers must step up output without compensation.

Industry:

In the simplest terms steel management's position on incentives is this: A worker's standard hourly wage rate is just compensation for a fair day's work—and to earn a bonus he must produce more by greater effort.

This isn't a definition the steel companies pulled out of a hat. Its basis is the Steel Wage Rate Inequities Agreement of 1946.

All Jobs Classified

Bringing order out of chaos, the Agreement eliminated wage rate inequities built up over many years by hit-and-miss handling of labor problems. It established 32 job classifications covering all work done in the mills.

Most important of all, say the steel companies, the Agreement provided compensation for everything a man brings to his job *except willingness to work at an incentive pace*. Furthermore, the companies point out, the Agreement represented a joint effort of the industry and the union.

12 Yardsticks Used

Specifically, mill jobs were described and classified. In doing this, the negotiators used these 12 factors as yardsticks: pre-employment training, employment training and experience, mental skill, manual skill, responsibility for materials, responsibility for tools and equipment, responsibility for operations, responsibility for safety of others, mental effort, physical effort, physical surroundings, and hazards.

Original increment between job classes was 4¢ an hr. Succeeding contract negotiations resulted in increases in the increment to 5½¢ an hr.

The Agreement served to concentrate management's attention on the whole matter of incentives. The standard hourly rates agreed to were high, and the Agreement stipulated that these standard rates would be the incentive base for any new incentives.

For this and other reasons steel management believes it can justifiably insist on firm standards in setting up incentive programs. This sometimes leads to friction.

Union and management tried for years without success to settle on a yardstick for determining what constitutes a fair day's work—that is, how hard must a man work to earn his base pay. In absence of a yardstick, the companies with few exceptions reserve the right to establish incentives based on their own studies and put them into effect—without prior union agreement. The union is free to file a grievance.

No Pay for Idle Time

One management incentive plan is the so-called "work load" system based on the premise that a worker normally moves at a given speed under a given load and produces x number of units. By increasing his effort above a normal pace the worker can produce more units and earn incentive pay.

Underlying philosophy of the work load system is this: there shall be no incentive pay for idle time—that is when a man is neither physically engaged or at attention in operation of equipment.

Another approach is the "full equipment utilization" theory. Under this system a company determines how many units a machine can turn out when operated at "practical" capacity rate. If the workers utilize equipment so as to achieve this "practical" rate they receive incentive pay to compensate. This system increases worker incentive earnings opportunities.

One of the main union gripes is

The Core of Disagreement

Iron Age Pittsburgh Editor J. B. Delaney interviewed many steel industry industrial relations executives to present management's view on incentives. On the following page, the union speaks for itself.

Within the pace-setting steel industry flare-ups of labor strife have as their root the differing concepts of management, labor on incentives.

Management seeks to reward the individual worker for that extra effort leading to increased productivity.

The union wants to broaden the base of incentives to the many instead of the "favored few." Increased production should be the criterion for applying incentives—rather than extra individual effort, the union argues.

that not enough workers share in incentive earnings. The companies acknowledge the complaint but point out that due to the nature of some jobs the workers involved "cannot exert an affirmative measurable effort to increase production." The grievance is not justified, says management, since no worker is entitled to incentive pay where he cannot produce at a measurable incentive pace.

Steel management also insists on reserving the right to revise incentives because of new or changed conditions resulting from mechanical or production improvements.

Union Argues Its Case:

To the union, discussion of incentives raises four general questions, says Elmer J. Maloy, of the Steelworkers.

(1) Do we want incentives?

(2) If so, to what extent should they be applied—over all employees, or just part?

(3) Can some uniform system be applied in the industry, and what compensation should we expect?

(4) How should disputes over applications be handled or settled; by arbitration, by mutual agreement or by the right of the union to strike?

Incentives for 50 Pct

. . . In conversations with five of the major steel companies in the past several weeks, I have been advised that between 45 to 50 pct of the employees in these companies are covered at the present time by some sort of an incentive plan. . . . While the average earnings under these plans at present are roughly between 20 pct and 25 pct over the present Standard Hourly Rate, the earnings for individuals under these plans or rates, in lieu of incentives, range from one-half cent an hr above the Standard Hourly Rate to about $4 an hr above the Standard Hourly Rate.

It is small consolation to the fellow getting one-half cent hourly bonus to tell him that the average is 25 pct above the hourly rate for all incentives. I believe the figures given above for the five companies might well hold for the entire steel industry. . . .

Let us now take the second question, the extent of incentive application desired by the union. . . .

. . . There is no special pattern (now in existence). . . . Generally, the so-called key production workers get the "lion's share" of any benefit from any increase in production and most of the other employees are forced to increase their efforts without any additional compensation or increase in the size of the crew. This fact gives rise to more dissension among workers than any other single thing attached to this problem.

Wage Incentive View

As a concise example of union thinking on wage incentives, THE IRON AGE presents a digest of a recent statement by Elmer J. Maloy, director of the wage division, United Steelworkers of America.

In many cases, the semi-skilled and unskilled worker gets a higher average hourly earning than the skilled craft or maintenance worker. If we are to have incentives, I believe that any benefits derived should be extended to the greatest number possible.

On the . . . third problem, the type of incentive compensation . . . I believe production must be considered as the main factor in the application of any new or changed incentive. A combination of both production and effort may be used to advantage always considering the company's desire to obtain increased production with lower unit costs.

Incentives should be expressed in the simplest possible terms so that the ordinary worker can calculate his earnings. . . . After the goal has once been set, they should yield 1 pct increase in pay for 1 pct increase in production. Incentives should not be changed unless there has been a substantial change in the methods or equipment involved in the operations, not merely because earnings have increased or some minor change has been made in the equipment.

As to the amount of compensation expected, I believe no incentive is worthy of the name unless the expected earnings are so conceived as to yield no less than 35 pct above the Standard Hourly Rate or the Guaranteed Hourly Rate with a 1 pct increase in pay for a 1 pct increase in production, not effort.

It's a Private Battle

Considering the fourth question, should arbitration, mutual agreement, or the union's right to strike be used in the settlement of (incentive) disputes?

. . . I do not believe an arbitrator should have the right to establish any rate of pay, that this . . . should be settled in some manner by the parties involved. . . . Generally, over the steel industry, as well as any industry, incentives have been established by mutual agreement. This has been accomplished either by agreement between Local Union Committees and Local Management, or by the union not filing a grievance against the installation — which amounts to the same thing, mutual agreement. The last phase of this problem and, I might say, the right of the union to strike against the incentives is being used in some industries with some tragic results. . . . This right to strike has many hazards unless the union has the corollary right to refuse to produce at an increased or incentive pace unless the incentive is satisfactory.

COMPACTNESS is made possible by porosity, smoothness of sintered plates.

Long-Life Battery Dons Civvies

After 4 years of military service, sintered plate nickel-cadmium batteries will also serve the civilian market. Sonotone Corp. last week announced that the new battery will go into production for civilian applications.

While the price tag may be from two to five times that of a standard lead-acid battery, a claimed life expectancy of 10 to 20 years should cut the long-term cost of present types in half, Sonotone said.

Here are some other claims made by the firm:

Smooth-surfaced highly porous plates permit an extremely compact cell to be made. Porosity results in an extremely high surface area and smoothness allows very thin separators.

Instead of acid, the Sonotone battery uses potassium hydroxide as the electrolyte. This freezes at −75°F and permits usage down to −65°F. Top operating temperature of 165°F is claimed. Cells may be charged as cold as −40°F.

No damage occurs when cells are left indefinitely in a state of complete discharge. A completely discharged battery can be fully charged in 30 minutes. Excessively high rates of charge or discharge, overcharging and even reverse charging are tolerated without cell damage.

Military requirements dictated rugged construction and cells have endured test shocks up to 50 times gravity as well as 15-gravity vibrations at frequencies from 50 to 500 cycles per second in each of three directions for several hour periods. Another feature of the cell's physical design is that use in any position—even upside down—is possible.

Illustrating his confidence in the battery, Dr. L. G. Hector, director of technical operations, has been operating his own car on a nickel-cadmium battery for the past 2 years. It looks lost in the standard-sized compartment.

STARTING in cold weather is easy. Note space left over in standard compartment.

As well as allotting some research and manufacturing facilities to commercial purposes, Sonotone has licensed American Bosch Corp. and Canadian Aviation Electronics, Ltd., to produce the battery on a commercial basis.

Steel:

Purchasing agents forecast 85 to 90 pct 1954 ingot rate.

Here's how the steel market shapes up according to the National Assn. of Purchasing Agents:

Construction, which took 12 pct of steel shipments during the first 9 months of this year, looks as if it will stay near that rate in '54.

The biggest steel consumer, the auto industry, took 20 pct during the same period and it expects to produce 5.5 million cars next year. This means a 10 pct cut in auto steel needs which should free several million tons of steel—mostly sheet—in 1954.

Plate and bar demand will likely dip as a result of declining defense outlay. Considering these and other factors, purchasing men anticipate a 1954 ingot rate of 85 to 90 pct.

Surveying seven major steel producers product by product, the association reports plate order books filled through January in some cases and expects the balance of the first half to be 10 to 15 pct short of capacity.

FOUNDRY: Engineers Quiz the Experts

Light metal casting session stretches to eight sessions, goes on the road, may become a movie . . . Here are the answers to the most-heard questions—By K. W. Bennett.

What do engineers want to know about aluminum and magnesium castings?

A Chicago sand foundry offered to brief 15 engineers, demonstrating an aluminum casting and answering the design men's questions about it. The original briefing scheduled for 15 engineers on a one-night stand, enlarged into eight sessions, and then went on the road by request. Currently it's a solid show, may eventually become a film.

Pattern design men with Howard Foundry, Chicago, exposed themselves to the barrage of questions. Briefly, here's what engineers want to know about aluminum and magnesium castings:

Is the molten metal poured under pressure?

No. The metal flows down into the mold by gravity.

How long will a complex wood pattern, used to make sand molds, last?

The one demonstrated had been used to make 187 castings and was still in good condition. If a semi-production pattern is desired, the wood pattern may be faced with brass or steel with small parts constructed of magnesium. Or the entire pattern may be made out of metal.

Are chills used over again?

These metal inserts, designed to even the cooling rate throughout the casting can be used over and almost indefinitely.

What are the purposes of the screens in the sump of a mold?

The screens bar inclusions and controls slow turbulence in the hot metal.

COMPLEX CASTING took 9 weeks lead time—2 to 3 in foundry, rest in pattern shop.

Can metal be used again, say the metal in risers, sprues, and gates?

This metal can be recovered in most cases. But reuse may depend on the type of metal and the use to which it will be put. For instance, Navy specifications for magnesium castings allow a certain percentage of riser scrap to be reused in aircraft parts.

Does the customer pay for excess metal poured into a casting?

He may pay a percentage of metal loss, but this is kept at a minimum. It's a cinch he's not paying for scrap metal on the casting, which the foundry can reuse. Where a whole casting is scrapped, it must be remembered that he's paying for delivered perfect castings.

Can a foundry control or lower scrap loss?

Yes. Proper gating, or placement of the passages by which hot metal enters the mold, is important. So is process control, meaning close check of pouring temperatures, sand mixtures used in the mold, constant inspection of newly poured castings. After first pouring, modifications in gating design, or the pattern's interior will avoid scrap castings.

Will a foundry pour more than two pots of molten magnesium or aluminum into one mold?

They'll pour as many as four pots, but the average for this operation has been two. It all depends on the size of the casting.

Why does a foundry ship castings that are actually scrap castings that can't be used by the consumer?

Every attempt is made to locate scrap castings before shipment and the inspection may include all of visual, magnafluxing, x-ray, and Zyglo inspection. A casting with three or four inner walls might slip by the x-ray with a defect in one of these inner walls, and leakers have slipped by. Testing also includes destructive testing of initial cast-

ings, and additional destructive testing of samples on longer runs.

What steps are taken to minimize porosity or foundry defects?

The foundryman keeps a close check on processing, makes a "hot inspection," uses x-ray, Zyglo and magnafluxing.

How about patching of castings by welding?

In the operation demonstrated, the welded article had to have the customer's OK, and then the weld had to be accessible to x-ray inspection on the aluminum or magnesium castings.

Is the size and number of chills used in a mold experimental when the mold is first designed?

The foundryman has a pretty good idea of how many he'll need from past experience. Accordingly, he'll start with the minimum number of chills and work up from there, if necessary.

Can cores actually be set with liquid sulphur?

Where cores might have a tendency to slip, the sulphur serves to hold the core in place until the metal is in the mold.

Can gas be detected, particularly on the surface of the riser?

There would have to be a considerable amount, more than the amount required to foul a casting.

How much lead time should be given to pattern making and the first experimental casting?

The complex casting pictured was put out in 9 weeks, with the actual casting operation taking only 2 to 3 weeks. For a really complex casting, the foundryman should be given 19 weeks, of which only 3 to 4 weeks is in the foundry after the pattern was complete.

To the veteran foundryman, some of the questions may have seemed pretty basic. They indicate, however, that the engineer is eager to learn how he can incorporate light castings into his designs, and is willing to learn from the ground up.

NICKEL: Expansion Gets New Look

Number of technical processes for recovery of nickel may drastically alter picture . . . GSA recommends end of fast tax write offs pending clarification—By *A. K. Rannells.*

General Services Administration has recommended to the Office of Defense Mobilization that no more tax-amortization certificates be issed for nickel refining capacity until the pattern of new technical developments of the "near future" becomes clearer.

This recommendation with respect to nickel expansion goals, now under ODM review, is the result of a study started by the now-defunct Defense Materials Procurement Agency and completed by GSA.

Reason for the GSA recommendation is that a number of technical processes for the recovery of nickel may completely change the picture.

New Capacity Coming In

Within the next 2 years, three nickel refineries expect to go into operation — two in the United States and one in Canada.

Sherritt-Gordon, near Edmonton, Canada, expects to get a plant into operation early in 1954 with an initial output of 9000 tons to be derived from sulphide concentrates.

This is expected to be followed soon afterwards by the opening of a National Lead Co. plant at Fredericktown, Mo., with a scheduled production of 1000 tons, also from sulphides.

"Why not let me apply my fresh, youthful mind to the problem."

Indications are that Hanna Nickel Smelting Co. will get its electric furnace smelter for production of ferronickel under way by late 1954. Its capacity is estimated at close to 9000 tons of contained nickel.

Sources at GSA said that ODM still has under consideration a proposal under which the Nicaro plant would expand its production by 75 pct, and also is considering a tax application by Freeport Sulphur Co. in Louisiana.

If plans for Nicaro are approved, the new capacity should be ready to go into production in late 1955. It is proposed to increase the present 14,000-ton capacity by 10,500 tons to a total annual capacity of 24,500 short tons.

Freeport Making Bid

So far, Nicaro has been able to produce nickel at a cost, including plant depreciation, below the current market. Whether it can continue to do so after new technical processes are put to work is problematical, it is admitted.

Closing of present expansion goals by ODM is not expected to have any bearing on Freeport's application for tax certificates.

Freeport's plans include installation of equipment near Moa Bay, Cuba, for mining of lateritic iron ores and installation of a sulfuric leaching plant for putting the nickel into production.

This nickel slurry would be shipped by tanker to a refinery which the firm proposes constructing near New Orleans. Present thinking is that the plant could produce 15,000 tons of powdered nickel a year.

STEEL POOL: Who's Denting It?

Price cartel formed by steel exporters in Pool countries violates spirit of ECSC plan . . . Producers cut prices below list level . . . How "dummy" export deals work.

European Coal Steel Community is suffering considerable embarrassment because of black-sheep antics by steel exporters and producers in the ECSC family. Reason for the red faces: (1) Pool producers are selling steel below their official published list prices, and (2) Exporters in ECSC countries have for some time been operating a steel export price-fixing cartel.

On both problems ECSC's High Authority has met resistance from producers and exporters every time it proposed a change in these practices.

The export price-fixing arrangement was arrived at independent of ECSC by steel exporters in Belgium, Luxembourg, Germany, France and the Netherlands (Italy is not included). Under this informal but effective Brussels agreement these steel exporters meet from time to time to set export prices. This price cartel violates the spirit of the ECSC plan calling for free price competition in opposition to traditional European cartel operations.

Ask End of Cartel

Even more threatening, the steel exporters in this price fixing agreement reportedly intend to divide up export markets and fix export quotas. As it is now, the Brussels group has quoted different export prices for different markets.

After unofficial protests last month by the U. S. and other nations (THE IRON AGE, Nov. 19, p. 53), ECSC's High Authority asked the steel exporters to break up their price cartel voluntarily. So far there has been no indication that they will.

Critics of the High Authority say the only reason ECSC leaders are concerned about the export cartel is fear that its continuance may jeopardize chances of obtaining a $500 million loan from the U. S. Supporters of the High Authority counter that the export price-fixing agreement cannot help but affect domestic European steel prices.

Sell For Less

One possible solution to the problem is establishment of a maximum-minimum price schedule by the High Authority. However, this idea was discussed and rejected at a meeting of the High Authority's Advisory Committee earlier this month. This action by the committee does not prevent High Authority from going ahead with the plan, but it does lessen the chances that it will be put through.

Meanwhile steel exporters are catching trouble from yet another quarter. Softness of the steel export market is forcing exporters to sell below their agreed price levels. It is reported that only a few weeks ago merchant bars were offered to Sweden at $78 per metric ton instead of the agreed price of $86 per ton. Structurals were quoted at $80 per ton instead of the regular $86 per ton price.

"It's nothing personal. I have to start this time and motion study *someplace*."

Internal trade between members of the Steel Pool is another ECSC trouble area. Under Article 60 of the treaty establishing the European Coal Steel Community, steel producers are required to publish their prices. Certain rebates on list prices are permitted if producers wish to absorb freight costs.

But the market has been so weak that Steel Pool producers have been offering rebates considerably higher than the freight charges. Franz Etzel, vice-president of the High Authority, recently stated that actual steel prices are now 7-20 pct below official list prices. This "will force us soon to revise the existing system of price quotations," he added.

Dummy Deals

THE IRON AGE also learned of another technique being used to get around ECSC objectives. Since steel exported from the Pool countries sells for less than steel sold within the Community, some steel buyers in ECSC countries work dummy export deals to get ECSC steel at export prices.

For example a steel buyer in Hamburg might arrange to have a steel buyer in Lisbon place an order in Luxembourg for 1000 tons of merchant bars, f. o. b. Antwerp. When the steel arrives at Antwerp, the Lisbon dealer pays the bill but orders the steel delivered to Hamburg instead of Lisbon.

Result of this transaction is that the Hamburg buyer gets the steel at the lower export price and doesn't have to pay import duty since the steel is being shipped within Pool countries. Amount saved on deals like this is reported to be as much as $22.50 per metric ton.

With domestic prices dropping this type of traffic may die out.

Know When to Bend

In spite of these specific problems and the even greater difficulty of overcoming national differences, ECSC has nevertheless had surprising success.

One of the main reasons ECSC

has not been shattered by the many conflicts that have arisen is the wise leadership of the Pool's High Authority. These men, headed by France's Jean Monnet, have shown a keen ability to determine when they can impose their authority without wrecking the Community, while holding back on other issues that might create too much opposition at this early stage of the ECSC development.

In addition to its flexibility, ECSC has another important asset: Support from the vast majority of Europeans.

Aids Peace

As one foreign source told THE IRON AGE, the situation is "similar to former times when a weak king was succeeded by a youthful crown prince. If he showed any indication of developing into a strong leader, he immediately received the whole-hearted support of the nation."

As it now stands, ECSC is the strongest bulwark against excessive nationalism and is the best guarantee that West European countries will work together.

Government

Scrap:

Military forces must justify their processing plants.

Reasons why the military forces may want to retain any or all of their 61 ferrous scrap processing plants must be reported to Assistant Defense Secretary Charles S. Thomas by Jan. 8.

Thomas, who directs the Defense Dept. logistical program, appears ready to take a firm position opposing any Army, Navy, or Air Force arguments which fail to make a good case for the plants. His recent memorandum calling on the three departments to analyze carefully their scrap operations stated:

"A review of the information contained in reports transmitted in accordance with previous instructions generally indicates that the quantity of scrap processed does not justify the utilization of major processing equipment."

This view is in line with the general theme of a late-November directive from Defense Secretary Charles E. Wilson, describing Defense Dept. policy in relation to private business. The policy, according to Mr. Wilson, is not to man and run facilities of "industrial or commercial type" if it is practicable to have the work or service performed by private operators.

Rep. Cecil M. Harden, R., Ind., who believes it likely that most of the military scrap processing plants will be shut down, calls the Wilson directive "a step in the right direction." Mrs. Harden heads a House subcommittee on inter-governmental relations, which has been looking into various federal plant operations.

Wilson and other department and bureau heads, she says, will be asked to examine all such activities under their jurisdiction to find whether there is an actual requirement for them.

Transportation

Debut Light-As-Air Jeep

It looks like a jeep, acts like a jeep. What is it? A jeep—Willys' latest model—but it's a lighter, stubbier version of the Army standby and is designed for airborne operations.

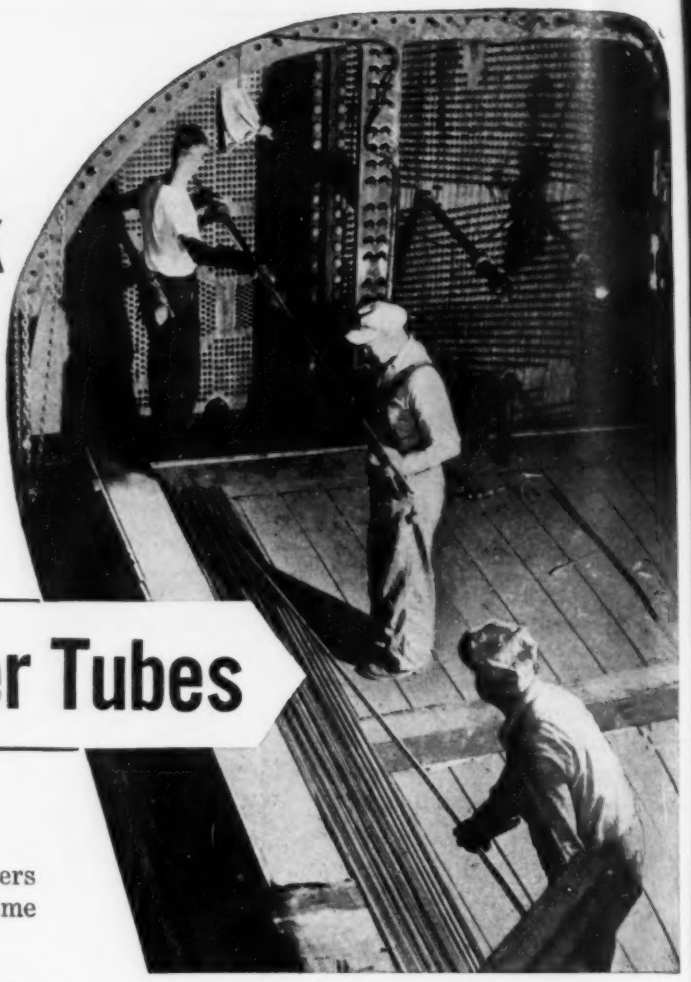
Previewed by top-ranking military officers in Washington last week, the new Aero Jeep combines ruggedness and versatility on the ground with lightweight for plane or helicopter transport, company officials say.

Weighing only 1475 lb the Aero model is 1200 lb lighter than the standard jeep and is almost 3 ft shorter. It can carry a load of more than 1000 lb over roads and 500 lb over rough terrain. About 85 pct of its parts are interchangeable with standard jeep parts. Top speed is 70 mph.

Most of the tremendous weight reduction achieved is a result of the Aero's all-aluminum body which weighs only 81 lb. In addition it has other aluminum parts and magnesium wheels.

Only 9 ft 4 in. in length, the Aero can nevertheless carry four passengers and may be used as a command car, an ammunition or cargo carrier, a frontline ambulance, gun carrier or as a towing vehicle.

One Way to Lick Corrosion and Wear of Heat Exchanger Tubes



Anaconda 70-30 Cupro-Nickel Tubes, produced by AMERICAN BRASS COMPANY, Waterbury, Conn., were used to replace tubing of Admiralty Metal at the Harbor Steam Plant, Dept. of Water and Power, City of Los Angeles, Calif. View shows men retubing part of a 70,000 sq. ft. surface twin-condenser with 5,878 Anaconda cupro-nickel tubes ⅞" O.D. x 26' 3" long, serving a 75,000 KW turbine.

It takes a lot of handling to retube heat exchangers . . . and while the job goes on, equipment downtime plays mischief with production.

Minimize the risk of such shutdowns. Wherever heat-transfer capacity is a factor, especially where wall thickness of tubes allows but little tolerance for effects of corrosion and erosion, specify 70-30 cupro-nickel tubes.

Thin walls of this strong tough alloy resist corrosive and erosive attacks from all sorts of cooling media including polluted, silt-laden harbor water.

Along with ability to withstand a wide variety of corrosive agents, the 70-30 cupro-nickel tubing provides outstanding resistance to pitting and stress corrosion cracking.

* * *

Aship or ashore, this alloy gives unsurpassed performance in vital parts of equipment exposed to salt water corrosion.

In power generator stations, sugar mills, oil refineries and similar plants . . . cupro-nickel alloys serve in feed water heaters, condensers, evaporators and other heat exchangers, and in oil coolers, stills, water boxes, piping, tanks, and other equipment. Cupro-nickel alloys minimize maintenance and replacement expense, loss of heat transfer capacity and interruptions of operation resulting from corrosion.

Cupro-nickel is produced in tubing, rod, strip, wire and sheet, and also in cast form. We shall be glad to give you additional information and help you select the one best suited to your requirements. Write us today.

At the present time, nickel is available for the production of cupro-nickel and other alloys containing nickel, for end uses in defense and defense supporting industries. The remainder of the supply is available for some civilian applications and governmental stockpiling.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

BONUSES: What Employers Should Know

Now is the time to compare your bonus policy with labor and tax laws . . . Check for compliance with laws on salaried personnel . . . Here are answers to main questions.

As the 1953 calendar runs out, companies should review policies on bonuses and compare them with labor and tax laws. As an aid to management, National Foundry Assn. outlines the problems, gives some answers.

Employers are faced with three questions on Christmas bonuses: (1) Must they be included in wages for payment of overtime under the Wage-Hour Act? (2) Are they deductible in figuring the employer's taxable income? (3) Are they subject to employee's withholding tax?

Discretionary bonuses, Christmas bonuses and special occasion gifts, and profit-sharing plans need not be included in computing regular hourly rates and overtime if they meet certain specific requirements.

Mustn't Be Obligatory

The discretionary bonus must be paid without obligation solely at the discretion of the employer as to quantity and whether or not it shall be paid. Discretion must be retained until nearly the end of the period covered.

Christmas or gift bonuses must not be measured by hours worked, production or efficiency. They must not be so substantial that employees regard them as part of their pay. They must not be paid pursuant to contract. But a bonus or gift will not be disqualified if previous regularity has led employees to expect it or if it varies according to salary, hourly rate or length of service.

Profit-sharing plans, covered in a separate regulation, must generally satisfy requirements of discretionary bonuses to be exempt from computation of regular rate or overtime provisions of the law.

Should a bonus fail to meet these requirements it must be included in computing regular hourly rate of pay and overtime compensation. The problem of additional overtime may be avoided by basing a bonus on percentage of total wages including overtime. This automatically takes care of additional overtime required by law.

Generally, bonuses may be deducted from an employer's taxable income. In this case it is subject to withholding tax. The bonus may be in the form of cash, goods or services.

If the bonus is so large that it exceeds "reasonable compensation for the job" the employer's deduction will be disallowed. If the employer takes no deduction, treating the bonus strictly as a gift, no withholding tax should be paid by the employee.

Under the Taft-Hartley Act, bonuses, since they may be considered as part of employees' compensation, may be subject to collective bargaining if a change in practice is contemplated. An NLRB ruling to this effect has been sustained in the courts.

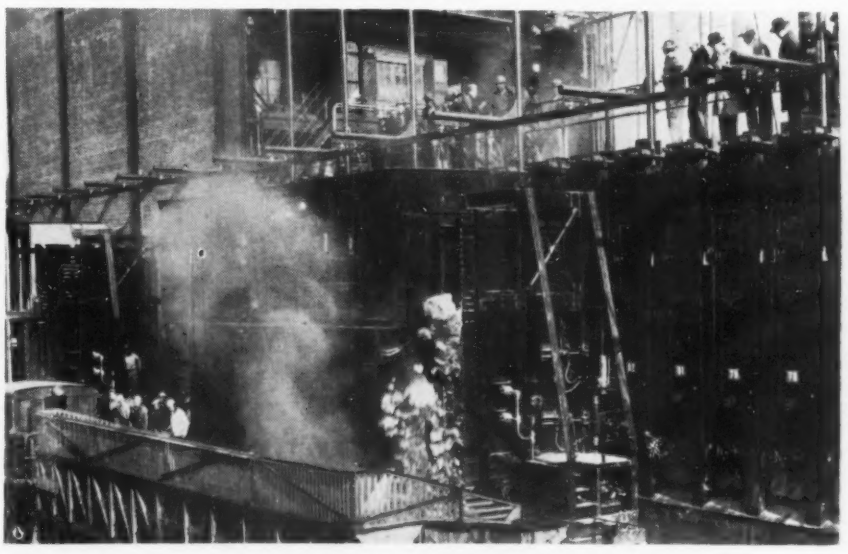
Where a union organizing campaign is in progress, an employer who adopts or alters a bonus plan may be charged with interference by the union. If the bonus is used to discourage employees from joining, NLRB will find the employer guilty of an unfair labor practice. Continued payment of a customary bonus will not be so construed.

The association also reminds employers that Jan. 1, 1954, is the deadline established in the Fair Labor Standards Act for compliance with the ruling on "exempt" personnel.

Who Is Exempt?

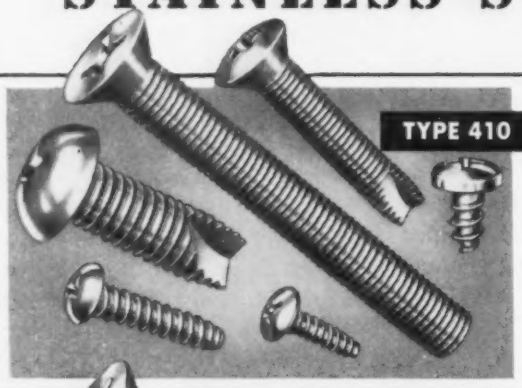
To qualify as exempt, executive, administrative and professional personnel must satisfy certain other requirements. Primary one is that they must be paid on a salary basis as defined in the law. The only exceptions permitted for exempt employees who have worked only part of a week are payments for disability benefits, military leave or jury duty.

Since these are the only exceptions, any policy which does not comply destroys the exempt status of adminstrative, executive and professional personnel. They will then come under the Wage-Hour Law and must be paid overtime for any work over 40 hours a week. Compliance may be achieved by a company if it revises policies to come within the interpretation of the statute and pays employees in this category for any deductions or offsets improperly made before.



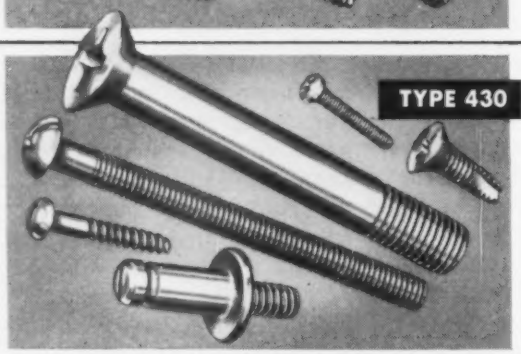
FIRST COKE to come out of Jones & Lauglin's new 79-oven battery. Cost was $11.2 million, will produce 39,500 tons a month. J & L now has 379 ovens.

THESE ARE AMERICAN
STAINLESS STEEL FASTENERS



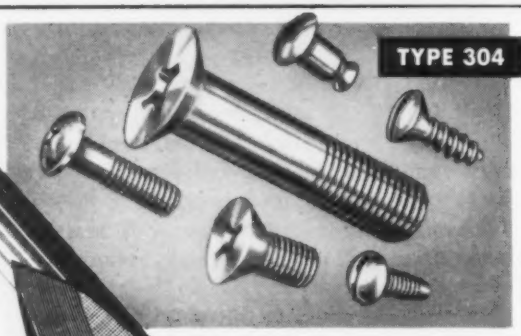
TYPE 410

TYPES & CHARACTERISTICS	APPLICATIONS
Self-Tapping Screws Wood and Machine Screws Used where high strength and moderate corrosion resistance are required	Automobiles, trucks Counter tops Metal storm sash, screens, awnings Railroad cars Refrigerators Stoves Washing machines



TYPE 430

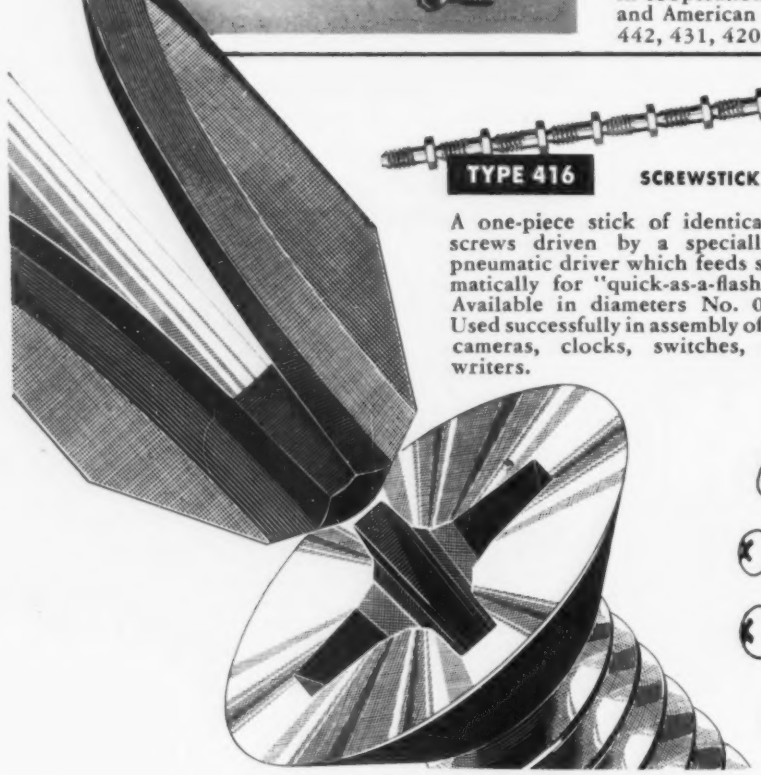
Wood and Machine Screws Self-Tapping Screws for special applications Used when good corrosion resistance is required	Appliances Automobiles, trucks Counter tops Metal storm sash, screens, awnings Refrigerators Stoves Washing machines



TYPE 304

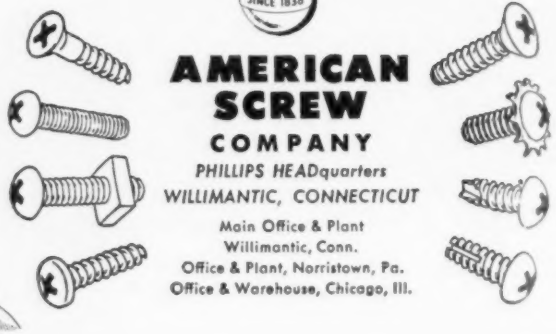
Wood and Machine Screws Aircraft Fasteners Self-Tapping Screws for special applications Used where excellent corrosion resistance, nonmagnetic and heat resistance are required	Aircraft Chemical processing equipment Counter tops Electrical and electronic equipment Kitchen and restaurant equipment Medical equipment Refrigerators Stoves

The following types can be furnished for specialized applications in cooperation with the engineering personnel of customers and American Screw Company — Types 305, 442, 431, 420, and 18Ni-16Cr.



TYPE 416 SCREWSTICK

A one-piece stick of identical precision screws driven by a specially designed pneumatic driver which feeds screws automatically for "quick-as-a-flash" assembly. Available in diameters No. 0 to No. 6. Used successfully in assembly of appliances, cameras, clocks, switches, toys, typewriters.



AMERICAN SCREW COMPANY

PHILLIPS HEADquarters

WILLIMANTIC, CONNECTICUT

Main Office & Plant
Willimantic, Conn.
Office & Plant, Norristown, Pa.
Office & Warehouse, Chicago, Ill.

FORGING: Rebounds After Fall Slump

December drop forging bookings improve . . . Good '53 volume assured . . . Some dip seen next year . . . Trends of market . . . Forgers brace for competitive selling—*By R. M. Lorz.*

Drop forging has rebounded from an early Fall slump. December bookings for the industry are coming in at a much better rate. Current volume is strong enough to assure producers a good year in 1953. A slight gain in dollar value of 1953 shipments is expected over last year. Next year may not be quite as good.

Some sources estimate total 1953 shipments will be close to 1¼ million tons with a dollar value approximating $650 million. In 1952 shipment of 1.2 million tons of forgings brought an estimated $600 million into the drop forging till. If year-end predictions are close to the mark, and they usually are, an overall gain of about 5 pct should be chalked up.

Backlogs Dwindle

Sizable automotive cutbacks and year-old inventory adjustment did hit producers of commercial drop forgings. In October and November, model changeovers, introduction of new products and inventory tightening resulted in a 20 pct drop in sales of some forgings producers. Many firms relying heavily on automotive and agricultural demand had to lay off some workers on second and third shifts. All of these men have not yet returned from furloughs but promise of a brisk first quarter should bring them back.

Fall's slowdown was not entirely harmful. According to many drop forgers, backlog fat came off and operations generally were tightened up. Shipments have been moving at a good pace throughout the year. Backlogs in most instances have dwindled from the 5 and 6 months level prevailing in late summer.

Preparations for brisker competition in 1954 are already in high gear. Replacement of obsolete furnaces and heavy presses is expected to increase industry capacity by at least 100,000 tons in the coming year. There are some expansion plans on the drawing board but industry generally will confine itself to replacement.

Improve Industry Position

Cost reduction is also consuming a lot of midnight oil. Over 75 pct of producers of commercial drop forgings employ less than 300 people. These small plants must compete with each other on a jobbing basis. Outside competition from castings and stampings can't be overlooked either.

Heavy investment in new equipment is a contemplated step in the direction of more sales. Technological advances in cold forging, weldments, and assembly work are also bolstering the industry's competitive position.

At least three industry-wide sales conferences will be held within the next two months. Need for concentration on hard selling is paramount. Many small producers still are not fully convinced that a good product and time weathered customer relations won't do the job alone. Those who are bracing for an extra effort are expanding sales forces and introducing methods study groups, new cost systems and statistical quality control.

"About your suggestion to 'Sell yourself as well as the product.' Well, I did. I'm now working for another firm."

In their effort to attract better men, forgers are also clashing with the industry's No. 1 human relations problem—noise. A special committee appointed by the Drop Forging Assn. and a contingent of acoustical engineers and college researchers are currently working to reduce the industry's noise level.

What does the industry look forward to in 1954? Producers generally share the almost universal belief that there will be some output slippage. But no one expects sales to drop more than 10 pct in the coming year.

Follow Hardware Trend

Sales graphs in the civilian area probably will follow the curve plotted next year in the consumers' hardware market. Forging shipments usually follow this curve without much deviation.

Hope for a good year in automotive, heavy machinery and machine tool markets also seems justified. Agricultural demand seems to pose the only real question mark. And even in this field at least one tractor producer is currently pressing suppliers for more forgings.

Housing Starts Pass Million Mark

Dwelling-unit builders, looking forward to a 1954 total of at least 1 million more housing starts, pushed past that mark for 1953 by beginning work on 80,000 units in November.

In the first 11 months, U. S. Labor Dept. reports, starts were made on 1,031,300 new non-farm dwellings. This figure is less than the 1,055,500 for 1952.

Starts of privately-owned housing declined by almost 11 pct in November, but the drop was less than usual for the month. In each of the 3 previous years, the October-November drop amounted to about 18 pct.

Notice the CONCAVE SIDES of the Gates V-Belt-

(U.S. PATENT NO. 1813698)

. . . that's why Gates V-Belts Last Longer!

Look at this!

In *half a minute* you can prove for yourself the belt-saving advantage of the CONCAVE SIDES.

Take any *straight-sided* V-Belt (Fig. 1) and bend it as it bends in going around its pulley. At the same time, grip its sides with your fingers and *feel* those sides *bulge out* as in Fig. 1-A.

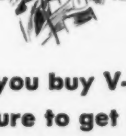
Clearly, those bulging sides will press *unevenly* against the V-pulley—and this causes extra wear at the points shown by the arrows (Fig 1-A).

Typical Gates Vulco Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer belt wear.

Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)

As the belt bends, grip its sides—and you will feel the precisely engineered CONCAVE SIDES *fill out* to an *exact fit* in the sheave groove (Fig. 2-A).

These sides press *evenly* against the V-pulley. All wear is distributed *uniformly* across the full width of the Gates Vulco Rope—and this means *longer* belt life and *lower* belt costs for you!



When you buy V-Belts, be sure to get the V-Belt with the CONCAVE SIDES— The Gates Vulco Rope.

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and in 71 foreign countries.

CS-537

V-Belts — Hose Molded Rubber Goods for industry World's Largest Maker of V-Belts

Gates® VULCO ROPE DRIVES

THE GATES RUBBER COMPANY • DENVER, U.S.A.

DRAWING PATTERN of main rear strut of AM-421 from flask in foundry.

Non-Magnetic Gear Beats Red Mines

Sometimes the old-fashioned way is the most modern. When Red magnetic mines made steel minesweepers obsolete in Korea, the Navy reached back in its history, came up with wooden ships. And in addition to the waterproof wood laminate hulls, all metal equipment had to be non-magnetic for complete safety.

Metallurgists had a field day balancing requirements against stress and serviceability for the new minesweeper classes—AMS-60 and AM-421. Final specs called for some parts of aluminum bronze, some manganese bronze, and others silicon bronze. Bitts and chocks are Navy "M" metal. Certain classified items for deck use are 316 nonmagnetic nickel stainless.

Casting and fabricating posed special problems, but firms like C. I. Capps Co., Inc., Jacksonville, Fla., couldn't resist the challenge. Parker Capps, present owner, claims that only standard machine tools and general machine practice were needed. But it also took a lot of care and ingenuity to keep production up and costs down.

A special headache was welding stainless tubes and flat stock. The specified welding rod tested nonmagnetic before use, but finished welds were magnetic. A new welding technique had to be worked out with Airco equipment to do the job.

Considerable ingenuity and craftsmanship were needed to eliminate a potential bottleneck on the propeller shaft stern tube which hooks into the stuffing box. Plans called for a silicon bronze extrusion over 11 ft long and just under 1 ft diam. Specified wall thickness was $\frac{3}{8}$ in.

But extrusions of that stock and diameter were not available in the required length. As an alternative, the company, with Navy permission, modified the plans to use tubing formed and welded from flat stock.

The stern tube is now partially formed in a power brake, placed in compression and hand-powered into shape. Concentricity tolerances are held to 1/6 in., a pretty good commentary on what skilled workers can do with little more than a sledge. Welding is done in a fixture that butts the edges together.

Rudder stock is forged up North, but Capps machines it in Jacksonville. Both ends of the 10-ft forging are tapered on a 32-in. Axelson lathe, after which one end is squared and a keyway cut in the other on a Cincinnati milling machine. Finish grinding is done on a Landis.

Largest casting of the job is the rear main strut for the AM-421. Three thousand pounds of aluminum bronze go into the flask at one pouring. Finished strut has tensile strength of 90,000 psi, elongation of 6 pct and a 40,000-lb yield.

FINISH GRINDING taper of rudder stock on a Landis after turning and milling operations.

COMPANY OWNER, Parker Capps, inspects first rear strut.

CUTTING KEYWAY in one end of rudder stock on a Cincinnati Milling Machine after squaring other end.

ENDURO *Brightwork*

HELPS KEEP COIN SLOTS BUSY

To sell—*and keep on selling*—beverage dispensers are placed in high traffic locations, often fully exposed to weather.

Still, they should sparkle quality—inspire confidence—to attract thirsty "prospects." Just as important, they must stand up under rough usage.

That's why Mundean Manufacturing Company, Columbus, Ohio, who made this beverage merchandiser, uses ENDURO Stainless Steel for tops and trim. Judging from nationwide performance reports, ENDURO brightwork will help keep the coin slots busy for years to come!

Tough ENDURO *retains* its distinctive luster—resists rust and corrosion—resists abrasions and dents—requires little maintenance. Its hard, smooth surface is easy to clean and keep clean, *always*. Naturally, there's no plating to wear or peel.

Chances are, ENDURO Stainless Steel can *scintillate* the eye-appeal and *buy-appeal* of your products . . . at the same time, increase their wearability—their life span. Why not talk over the possibilities with Republic metallurgists? There's no obligation, of course. Just write.

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

Republic
REPUBLIC STEEL
ENDURO STAINLESS STEEL

Other Republic Products include Carbon and Alloy Steels—Pipe, Sheets, Strip, Plates, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

Machine Tools:

Defense production gets priority on leased U. S. tools.

Defense production will be the need first taken care of in assignment of the use of military-owned machine tools and related equipment, a newly-issued Defense Dept. directive emphasizes.

Aim of the directive, signed by Charles S. Thomas, Assistant Defense Secretary for supply and logistics, is to insure that production tools will continue to be available for mobilization needs.

The document also sets up a method whereby the military departments may file emergency requests for non-defense use of these tools. Under the Pentagon definition, non-defense production consists of those operations which do not turn out military end items or components.

Define Non-Defense Items

Note is taken in the directive of instances where production equipment may be used in manufacturing both defense and non-defense items. In such cases, operations will be regarded as non-defense when less than 75 pct of output is in the military end item or components field.

Emergency requests must present a strong argument that non-defense use of equipment will be advantageous from the standpoint of national economy. Mr. Thomas will evaluate the requests before turning them over to ODM.

Some of the information appearing in the requests must answer these questions:

1. What consideration, financial or otherwise, will Defense Dept. be given for use of the equipment?
2. Will the proposed user be required to maintain the equipment in condition as good as when it was turned over to him, normal wear and tear not excepted?
3. Is the proposed non-defense use connected with a commercial product in a competitive field?
4. If approval is not granted, what will it cost the department to store and maintain the equipment for the first year and afterwards?
5. If approval is allowed, would equipment ultimately be stored at the user's plant, near the plant, or at a central storage point?

Adopt New Standard Rifle Ammo

Five Western nations, led by the U. S., are ready to adopt the new .30 caliber (7.62 mm) lightweight cartridge developed by Army Ordnance Corps.

The U. S., United Kingdom, Canada, Belgium, and France are prepared to standardize the new cartridge, shorter and about 10 pct lighter than the present round for the M1 rifle and .30 caliber machine gun. This item has not yet been placed in the Army supply system. Automatic rifles which would use the light cartridge are to be built.

Decision to adopt the new cartridge followed tests showing no significant difference in the performance of 7 mm and .30 caliber rounds, the Army says. If the 7 mm round had been selected, all five countries would have had to retool their ammunition-making facilities.

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Fuse, 2800000, $2,286,200, Ritepoint Co., St. Louis.

Fuse, 1352000, $1,162,720, National Vendors, Inc., St. Louis.

Shell, illuminating, 352000, $4,702,720, Nesco, Inc., Milwaukee.

Repair parts for turbines, 966, $69,081, General Electric Co., Philadelphia.

Equilibrator spring, 2028, $54,857, American Steel Foundries, Hammond Div., Hammond, Ind.

Distributor, water, truck mtd, 106 ea, $247,384, Vic Cleaning Machine Co., Minn.

Distributor, water, truck mtd, 211 ea, $485,645, Pryor Mfg. Co., Mansfield, Ohio.

Casket, burial, metal, 1364 ea, $281,802, Cincinnati Coffin Co., Cincinnati, Ohio.

Alternator and voltage control equipt, V, $365,849, Westinghouse Electric Corp., Philadelphia.

Jacks, V, $61,327, Regent Jack Mfg. Co., Inc., Downey, Calif.

Microphone assy, 14000 ea, $76,230, Joyce Electric Co., Williston Park, L. I.

Governor assy, V, $77,698, Woodward Governor Co., Rockford, Ill.

Spare parts for support of P & W engines, V, $2,607,044, United Aircraft Corp., Pratt & Whitney Aircraft Div., East Hartford, Conn., *E. E. Champion.*

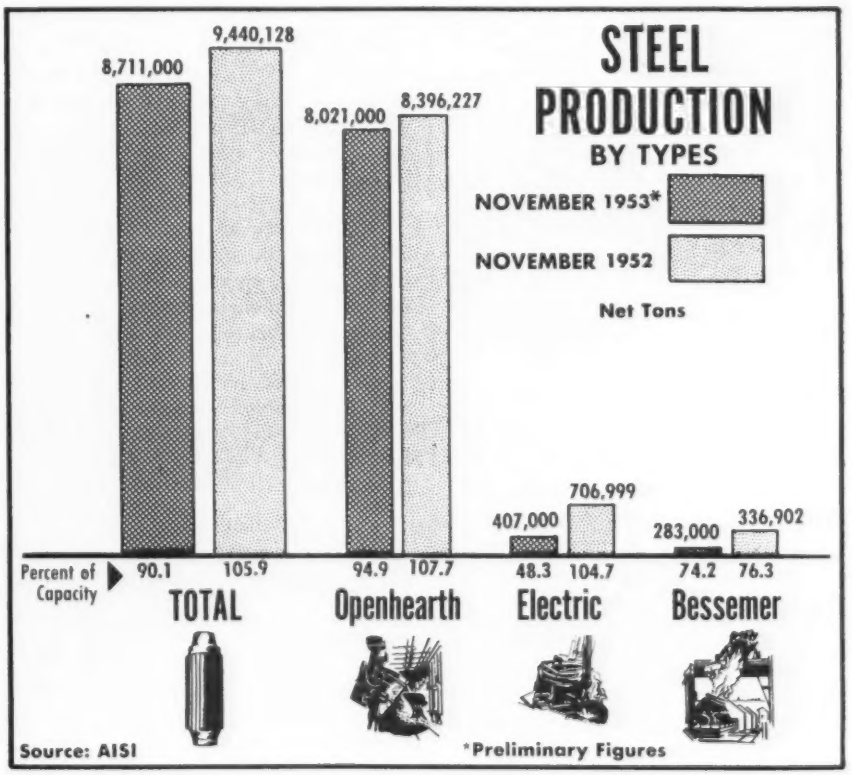
Material for J48-P-8, 1000 ea, $91,950, United Aircraft Corp., Pratt & Whitney Aircraft Div., East Hartford, Conn., *E. E. Champion.*

Cylinder machine, 511 ea, $122,568, United Aircraft Corp., Pratt & Whitney Div., East Hartford, Conn., *E. E. Champion.*

Material for use on R4360-59 engines, V, $95,080, United Aircraft Corp., Pratt & Whitney Div., East Hartford, Conn., *E. E. Champion.*

Spare parts for use on P & W engines, V, $242,234, United Aircraft Corp., Pratt & Whitney Div., East Hartford, Conn., *E. E. Champion.*

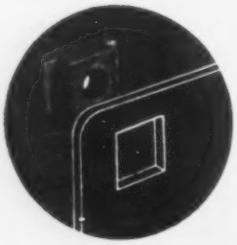
Spare parts for use on P & W engines, V, $575,110, United Aircraft Corp., Pratt & Whitney Div., East Hartford, Conn., *E. E. Champion.*



Fast-On

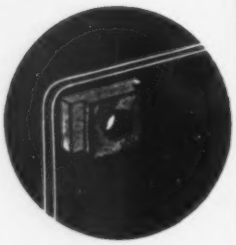
CLINCH NUTS

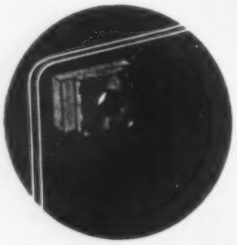
FABRI-STEEL "Fast On" clinch nuts increase thread area and use of lighter gage metal. They cut assembly, using shorter screws and speeding up assembly. Our engineers can help you improve your product. Send for detailed data sheets.



1 The square shape simplifies installation.

2 The small square portion is inserted and protrudes through the square hole that has been previously punched.





3 The protruding portion is now clinched at 4 corners with swaging tool.

4 Nut cannot work loose and variation in thickness of metal is taken care of automatically.

MILLIONS A DAY!

Automobiles
Refrigerators
Radio—TV
Appliances
Farm Equipment
Metal Furniture
Military Tanks
Ordnance Equipment

FabriSteel

PRODUCTS INCORPORATED

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Phone KEnwood 2-1380

Industrial Briefs

Air Jack . . . DUFF-NORTON MANUFACTURING CO., Pittsburgh, has a new-type jack incorporating the use of 80 to 100 lb of compressed air to operate a separate hydraulic pump. A special safety feature permits an operator to stand at a distance in the event the ram should slip while under pressure.

Almost Ready . . . ATLAS STEELS LTD., Welland, Ont., reports that its new continuous cold strip mill is nearly ready for initial commercial operations.

Trailer Plant . . . FRUEHAUF TRAILER CO. has opened a manufacturing plant in Westfield, Mass., where they will produce CarAVan aluminum trailers for eastern seaboard commercial business.

Navy Crane . . . DERRICK & HOIST CO., INC., Long Island City, will deliver a large capacity portal crane to the Philadelphia Navy Yard. Crane was designed according to Navy specifications to install heavy sections in ships under construction in the yard.

Well Rewarded . . . LEHIGH STRUCTURAL STEEL CO., Allentown, Pa., will distribute Christmas gift checks in excess of $40,000 among its shop and office employees and those of its affiliated companies.

Newly Formed . . . The Dumas Steel Corp., Pittsburgh, and the Caine Steel Co., Chicago, have formed the DUMAS-CAINE STEEL CO., at Marietta, Ga., with J. W. Clouser as manager.

Ground Broken . . . ROBERT-SHAW-FULTON CONTROLS CO. broke ground this month for a $500,000 plant expansion at the Anaheim Div. in suburban Los Angeles.

Inaugurated . . . THE BULLARD CO., Bridgeport, Conn., organized the Quarter Century Club. The 219 charter members were presented with gold watches.

Going Up . . . LANDIS MACHINE CO. is constructing a new plant at Waynesboro, Pa., to be devoted to the production of collapsible and solid adjustable taps.

Acquired . . . HARTFORD ELECTRIC STEEL CO., Hartford, Conn., has acquired control of the Ductile Iron Foundry, Inc., Stratford, Conn.

South of the Border . . . WALTER KIDDE & CO., INC., Belleville, N. J., has established a Mexican subsidiary, Walter Kidde de Mexico, S. A., with John F. Kidde as president.

At Your Service . . . O'BRIEN MACHINERY CO. has opened a sales and service office at Stoney Creek Mills, Reading, Pa., as part of its expansion program.

Dividend Declared . . . TEMCO AIRCRAFT CORP., Dallas, Tex., reports that its board of directors has declared a stock dividend of 50 pct to stockholders of record Dec. 21.

Things to Come . . . Research director of ELECTRO REFRACTORIES & ABRASIVES CORP., Buffalo, predicts tremendous expansion in the refractories and abrasives field within the next decade.

Elected . . . THE MATERIAL HANDLING INSTITUTE has elected Charles B. Elledge of General Electric Co., Schenectady, as president for 1954.

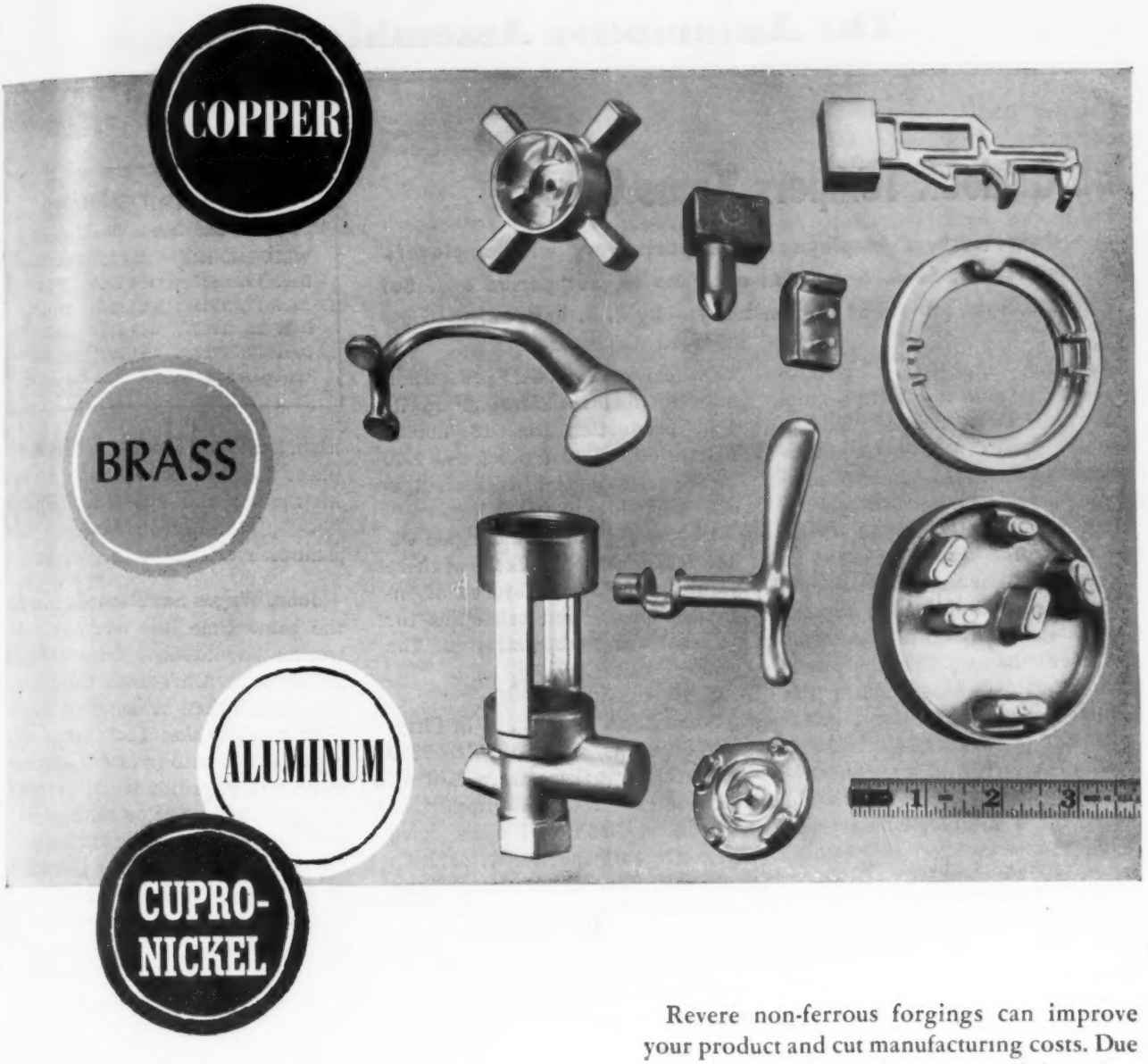
Re-Elected . . . AMERICAN INSTITUTE OF STEEL CONSTRUCTION re-elected as its president John E. Jackson, president of Pittsburgh-Des Moines Steel Co., Pittsburgh.

Hear Ye . . . CHARLES HARDY, INC., New York, has consolidated all foreign sales activities with its new International Dept. E. L. Hoeflich will be manager of the new department.

Purchased . . . A. O. SMITH CORP., Milwaukee, has purchased Glascote Products, Inc., Cleveland, which will operate as a subsidiary. L. T. Hickey has been named vice-president and general manager of the new subsidiary.

High-Speed . . . ARMCO STEEL CORP., Middletown, Ohio, inaugurated a new 2800-mile high-speed telegraph system which will speed the flow of messages between its headquarters at Middletown and its district offices and plants.

Quick Work . . . C & D BATTERIES, INC., Conshohocken, Pa., resumed limited production three days after a $1,000,000 fire destroyed the main factory buildings, offices, engineering department and laboratory. Approximately 80 pct of the floor area was destroyed.



Revere non-ferrous forgings can improve your product and cut manufacturing costs. Due to high strength-weight ratios, weight reduction often is possible. Complex parts now assembled in several pieces may be forged in one piece. Dimensions are accurate, reducing machining time, scrap, rejects. Surfaces are good; small details such as names, trademarks and numbers can be held sharp. Being uniform in density and free from blow-holes, Revere Forgings are non-porous and will hold fluids and gases without leakage. It will pay you to get all the facts about forgings. See the nearest Revere Sales Office.

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Job Outlook Tempers Xmas Cheer

Auto workers' employment prospects vary with employers' sales . . . Some firms plan overtime in first period . . . But Michigan jobless at 15-month high—By *R. D. Raddant.*

Looking into his Christmas stocking, an auto worker this Yuletide may have mixed feelings. Holiday cheer will be counterbalanced by seasonal gloom of midwinter layoffs, but record employment and payrolls throughout the year may give him satisfaction as he sips his Tom and Jerry.

Of course, there is no typical auto worker. To many, a week off for model changes with the promise of overtime when production is resumed may be a welcome interlude. But to thousands of others, a layoff slip with little encouragement of a speedy recall gives little reason for a cheerful holiday season.

More Jobless Now . . . Looking at Michigan as a whole, there are more jobless today than at any time in the past 15 months. The last official count, Nov. 15, showed 125,000 unemployed in the state including 76,000 in the Detroit area. It was estimated by Michigan Employment Security Commission that unemployment will continue to increase to 130,000 by Jan. 15, including probably 80,000 idle in the Detroit area.

MESC does not expect a return to volume hiring in Michigan industry in the next few months, notes the frequency of small layoffs in auto plants, parts suppliers, and related industries.

These general statements and total figures do not really tell the whole story. Each individual auto company has its separate story reflecting its own position.

Year-End Shutdown . . . Ford shut down production over a week ago, but resumed after a week for model changeover. Cadillac last week finished its 1953 production and shut down until Jan. 4 when new model production starts. Oldsmobile wound up its 1953 production Dec. 18, not to resume until Jan. 4. Buick was also in the midst of a 3-week changeover period.

But no gloom would dampen the holiday spirits of workers at these plants. They were assured of increased production schedules for at least the first quarter of the year.

Some Boost Output . . . In Chrysler divisions, about 7500 to 9200 production workers were laid off because of reduced production schedules. Nash will close down from Dec. 21 to Jan. 4 to "keep step with the current market" and Studebaker has disclosed a similar down-period. Plymouth workers face the prospect of an inventory period at Briggs Body which will bring a similar halt in production.

On the other hand, Chevrolet announced it is stepping up to two-shift production in six assembly plants in January and has been hiring men at the Flint assembly plant for 400 new jobs plus 600 hirings at the adjoining Fisher Body plant. Lincoln-Mercury has planned overtime at three plants.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Dec. 19, 1953..	106,820*	27,501*
Dec. 12, 1953..	91,857	21,288
Dec. 20, 1952..	104,638	30,295
Dec. 13, 1952..	91,806	29,784

*Estimated. Source: *Ward's Reports*

Jobs, Wages Set Records . . . At the same time, the average auto worker should have been able to keep up his Christmas Club payments, and then some.

Automobile Manufacturers Assn. reports that auto industry employment and payrolls set alltime records in 1953 while production was the second highest level in history.

Payrolls increased for the sixth straight year reaching a peak of $3.5 billion for an average employment of 930,000, which topped the 1951 record by 85,500. Total employment includes 770,000 production workers who averaged 40.8 hour of work a week at an average hourly rate of $2.14.

UAW Hits Layoffs . . . Meanwhile, seasonal layoffs are being jumped on hard by UAW (CIO) officials, no doubt as part of the campaign toward the guaranteed annual wage. An illustration occurred at Chrysler last week when union officials accused the corporation of "reckless and irresponsible over-scheduling" in the first half of 1953.

A Chrysler spokesman replied the industry is reverting to the prewar pattern of reduced sales in the winter, that it was company policy to keep as many employees working as possible. This pattern can be expected to reoccur from now on at almost any layoff.

Hold Price Levels . . . Price levels for 1954 models have now

been established at practically what they were in 1953. Two GM divisions, introducing their new cars last week, followed the precedent set in earlier announcement, indicating that other GM divisions may do the same.

Chevrolet prices are up $10 from 1953, but the extra sawbuck goes to the dealer, not the factory. Boost is in dealer handling charges which are allotted for getting the delivered car ready for the customer.

Station Wagons Cut . . . Pontiac prices remain unchanged except for station wagons which have been reduced $90. The new 11 in. longer Star Chief series starts at $2097 for the DeLuxe 4-door sedan compared with the custom 4-door Chieftan 8 price of $2009.51.

Chevrolet prices start at $1623 for the 2-door sedan and range as high as $2185 for the Bel Air convertible. Chevrolet prices are advertised delivered prices at Flint including federal excise taxes, factory handling charges, dealer delivery and handling charges. Pontiac prices are factory-retail, not counting taxes, delivery and handling charges.

Consolidate Plastics Research

In spite of Fisher Body's Sphinx-like attitude, it is generally assumed in Detroit that some of the most important work in plastics has been going on at this body building division of GM.

Last week official acknowledgment of Fisher Body's work in this field was made with the announcement of "consolidation of all Fisher Body experimental and development work in plastics."

Fisher Body has been doing development work in plastics for dies, jigs, fixtures, forms, molds and body construction materials for some time, although Chevrolet is making its own plastic Corvette bodies.

The combined operation will be headed by L. J. Lamm, plant manager of the new section, who was formerly staff engineer under the general manufacturing manager.

Engines:

Figure tooling costs for 13 million V-8's at $1 apiece.

Although new models have not yet been announced, it has been reported here and elsewhere that the Ford V-8 which has powered Ford cars since 1932 is on the way out with the windup of 1953 production.

At the end of the program, more than 13 million of these engines will have been turned out, giving Ford leadership in V-8 production that is so far ahead of the rest there is no good comparison.

In response to a request from THE IRON AGE, Ford archivists went back in the records in an attempt to find out the original tooling costs of the engine. But apparently tooling costs were as closely guarded at that time as they are now. One reference was found of an expenditure of $6,375,000 worth of machine tools that year, which might be interpreted as at least a substantial part of the engine's tooling cost.

This compares with estimates that range as high as $60 million to tool up for an engine today, assuming a production rate of a major manufacturer. Even of the archive figure represented only half the total tooling cost, Ford probably produced 13 million V-8's at a tooling cost of around $1 for each engine.

Tubular Frames Gain Popularity

Anyone probing deep into the design of Ford Motor Co. cars can note a heavy cross member of the frame beneath the engine that is tubular rather than the conventional rectangular shape.

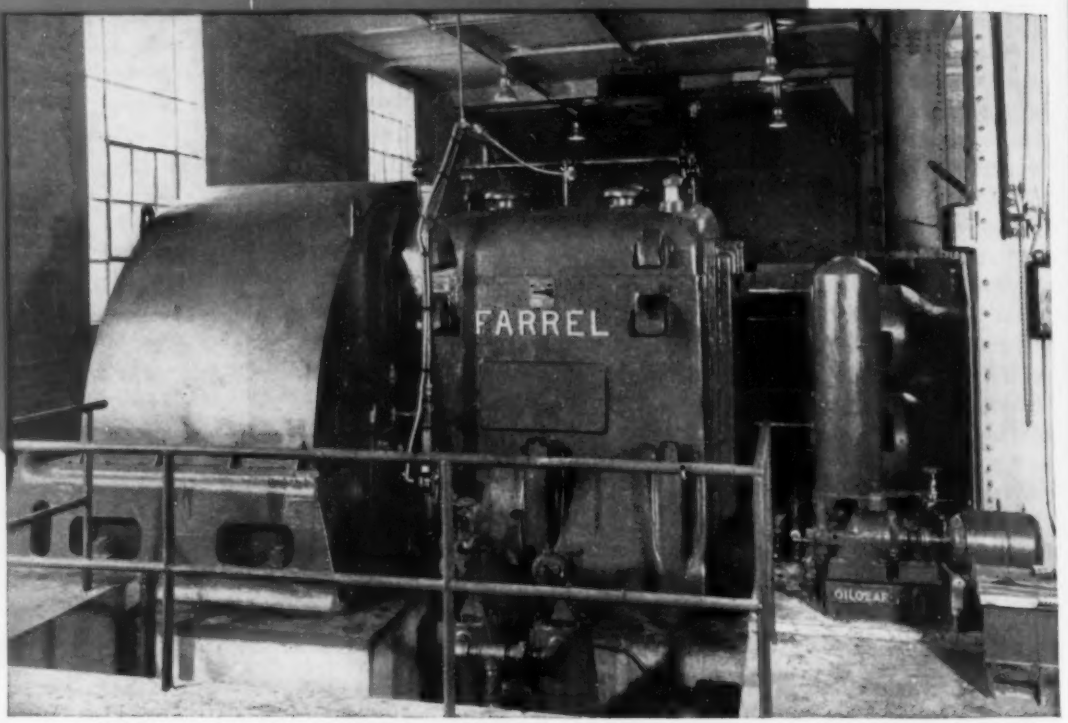
This is an item to file away for future reference because tubular frame construction is definitely on the way and not just for Ford. Another automaker has definite plans to place its next completely redesigned car on a tubular frame.

Big advantage of a tubular frame is that it can take equal stresses in any direction, probably leading to more rigidity. It will also eliminate necessity for expensive and very heavy dies.

THE BULL OF THE WOODS By J. R. Williams

WHY, I NEVER MADE ANY SQUIRT GUN THAT I REMEMBER!
I REMEMBER WHEN TH' BULL OF TH' WOODS USED TO SOLE HIS SHOES WITH OLD BELTIN', BUT I NEVER MADE ANY GOLF CLUBS!
OH, YES YOU DID! I HAD TH' COLLECTIN' HABIT THEN AND I KNOW!
EVEN A KID SHOULD LEAD A MODEL LIFE-- A COLLECTOR MAY BE AROUND! THAT'S HIS FIRST EXHIBIT, BUT WHY ONLY OF PROMINENT PEOPLE?
CUPGREASE FOR HANDLES
SHOE PAINT FOR SLEEPERS
THE PLAYBOYS
12-25
J.R.WILLIAMS

THE CASE OF THE MISSING GEAR WEAR



IT'S NOT a mysterious case. There's always wear missing when enclosed gears are protected with *Texaco Meropa Lubricant*. In one steel mill (name on request) life of gearing on tin-plate shears was more than tripled.

Texaco Meropa Lubricant has especially sturdy EP characteristics as well as notable resistance to oxidation. It stands up under heavy loads and severe operating conditions; does not thicken or foam. *Texaco Meropa Lubricant* has fine adhesive properties, is not affected by moisture, will not corrode gears or bearings. It does not separate in service or storage.

In roll stand circulating systems, use *Texaco Regal Oil*. It's a heavy duty, turbine-quality oil that separates easily from water, resists oxidation and sludging, keeps systems clean.

A Texaco Lubrication Engineer will gladly help you simplify and improve lubrication throughout your mill. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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TUNE IN . . . METROPOLITAN OPERA radio broadcasts every Saturday afternoon. See newspaper for time and station.

Ike, Congress Agree on Some Tax Cuts

Main tax program still to come . . . But White House, Hill are agreed on some revisions . . . Ease double taxation, expand medical credit . . . Relief for working mothers—By G. H. Baker.

Although the main points in President Eisenhower's forthcoming tax program are well-guarded secrets, it is now apparent that agreement has been reached between the Administration and Congress on a number of lesser points that are scheduled for inclusion in next year's omnibus tax-revision program.

Cut **Double Taxation** . . . Double taxation of corporate dividends, for example, is to be cleared up—but only to a limited extent. Tax-writing committees of Congress have for years been under pressure to limit dividend taxation to either the corporation paying taxes on its earnings, or individual income tax on the same dividends. Current congressional tax thinking is that individuals should be permitted to take a tax credit (say 5 to 10 pct) on dividends.

Unofficially there is wide agreement that this form of duplicate taxation should be completely wiped out, but the Federal Government's pressing need for revenue will prevent any such move in 1954. It is felt that the granting of tax credits—if it wins congressional approval—will at least be a step in the right direction.

Deduct Baby-Sitters . . . A second recommendation that seems destined for inclusion in next year's tax legislative package is that deductions for medical expenses be liberalized. Under the existing law, a taxpayer must show that more than 5 pct of his gross income goes for medical expenses before he is entitled to take a tax deduction. This figure may be reduced to 4 or even 3 pct, under present plans.

A third tax benefit that seems headed for enactment is a provision permitting working mothers to deduct the hire of baby-sitters. Whether or not they may deduct all, or only part, of the sums spent on sitters has not yet been determined.

Some Get Less . . . Scheduled reductions in individual income taxes won't mean a thing to several million workers in the lower brackets. In fact, take-home pay for many will be smaller. Higher social security taxes are the reason.

New congressional tax estimates show that employees in the middle and higher income brackets will net an increase in take-home pay, starting Jan. 1. But lower-bracket workers face larger payroll deductions—because of the social security tax rise—than they will gain through the automatic drop in income tax rates.

For example, a married couple with two dependents, earning $2,500 annually, will pay from $4 to $12.50 more in taxes in the coming year.

"He seldom comes right out and says anything about a design."

White House appeals for a postponement of the social security tax rise are finding little sympathy within Congress. Members of both parties believe that the increase must go through on schedule if the social security system is to avoid the "bankrupt" level.

Enforce Manpower Cuts . . . Defense Secretary Wilson is determined to ride herd on top Army and Navy brass in the months ahead in enforcing the terms of his new manpower reduction order.

Mr. Wilson intends to see that manpower cuts are confined to so-called service personnel. Combat strength is not to be cut. But Army officials in particular argue that it is "impossible" to cut deeply into the ranks of combat-supporting troops. Mr. Wilson is just as determined to prove that it is possible to cut the number of "housekeeping" soldiers.

Few Weapons Cuts . . . As a result of the Wilson position, there should be no significant reduction in orders for military weapons and equipment. Procurement of guns, tanks, military-type vehicles, and communications equipment is to proceed on schedule.

Pentagon accountants say the 10 pct reduction will spell out a saving of $1 billion or more in military pay during fiscal 1955. Additional savings are expected to result from curtailed purchases of food, clothing, other items.

In terms of total Defense Dept. manpower, the new order will mean a reduction of about 240,000 officers and men by the end of fiscal 1955, leaving total military strength at about 3,200,000. Army is to drop about 140,000 men, Navy about 77,000, and Marine Corps about 23,000. Air Force is not to be affected by the order.

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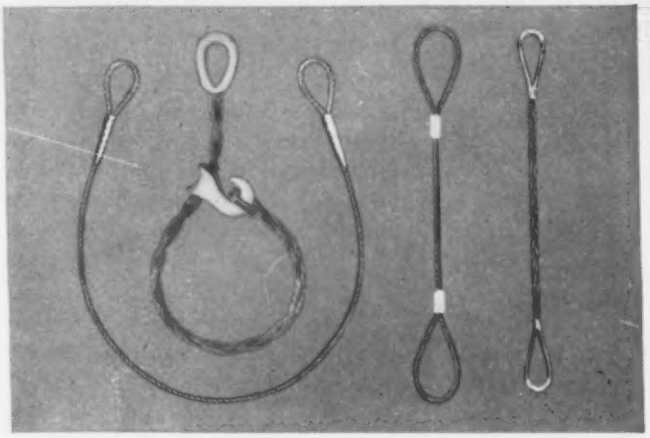

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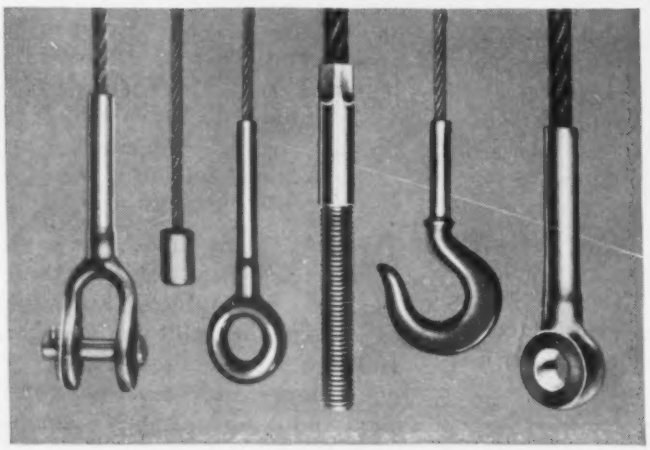
Slings

for lifting and moving materials, equipment in production or maintenance

There are hundreds of types and sizes of Macwhyte Round-Braided, Flat-Braided, Single-Part, and Grommet Slings. All are custom made in length, capacity, and flexibility to meet your needs. *Send for Catalog S-8.*



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Assemblies

for machine parts, controls, and operating devices

Macwhyte Safe-Lock wire rope assemblies are made to order in length, strength, and flexibility desired. Terminals are permanently attached to one or both ends. There are many standard types. *Send for Catalog 5201.*

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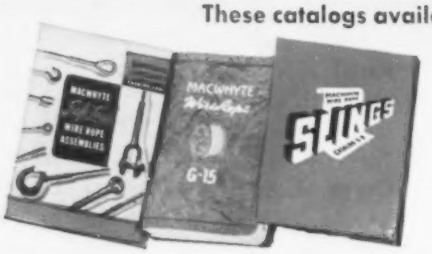

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Handicapped:

Employer interest rises . . . So does hiring in first 10 months.

Employer interest in the quality of work performed by physically handicapped persons is increasing, a new U. S. Labor Dept. report indicates.

In October, 26,040 disabled and partially disabled workers were placed in jobs, bringing the total hirings of this group in the first 10 months of 1953 to 224,500. Though the figure for October alone was about 5000 below that for the same month in 1952, the aggregate for the period Jan. 1-Oct. 31 was 2.4 pct above the total for the same period last year.

While Labor Dept. considers the hiring statistics encouraging, it notes that new applications from the handicapped through Oct. 31 added up to 267,900. Of this total, 95,200 were filed by disabled veterans. This last figure was 9 pct higher than that recorded in the same months of 1952.

Show Great Willingness

Job placements of the handicapped through Oct. 31 reached more than 20,000 in two states—New York, with 27,510, and Ohio, with 22,330. Next in line were Texas, 16,030; California, 13,780; and Michigan, 12,290.

Figures on high level of placements does not obscure the fact that job opportunities aren't keeping pace with applications. However, Labor Dept. has found large companies generally are showing great willingness to hire competent disabled persons.

Defense Synthetic Rubber Use Dips

U. S. Commerce Dept. recently lifted the veil of security surrounding synthetic rubber consumption, revealing that use for defense has been taking about 10 pct of total production.

Output has increased from 625,000 tons in 1951 to a rate close to 710,000 tons while defense orders have declined from 71,000 tons in 1951 to a rate approximating 61,000 tons.

NO RAIDING pact was signed last week by AFL and CIO leaders (l to r) W. Schnitzler, AFL secretary-treasurer; G. Meany, AFL president; W. Reuther, CIO head; James Carey, CIO secretary-treasurer. Pact is regarded as a step toward eventual merger.

Universal Training:

Political expediency seen dooming UMT despite backing.

Congress, with a long memory for voter reaction, is cool to the latest plan for universal military training.

Even before it was known whether President Eisenhower would back the National Security Training Commission proposals submitted to him last week, important Republican lawmakers were predicting a rejection on Capitol Hill.

House Speaker Joseph W. Martin, Jr., R., Mass., sees no change in the view of Congress that the draft and UMT should not operate simultaneously, as called for in both plans.

Chairman Dewey Short, R., Mo., of the House Armed Services Committee, won't even ask for a committee study on any UMT bill unless "they show me something new." Even Rep. Sterling Cole, R., N. Y., previously an advocate of universal service, hints he may not vote for the proposals, seeing little hope for House passage.

Essentially, the new UMT plan would require that 18-year-olds register with local draft boards for military service, the length to be determined by lot. Some would go on regular duty for 2 years, while others would be given 6 months of "basic and technical" training only.

This latter group (the "UM-Tees") would then go into reserves for 7½ years and would be liable to recall before veterans.

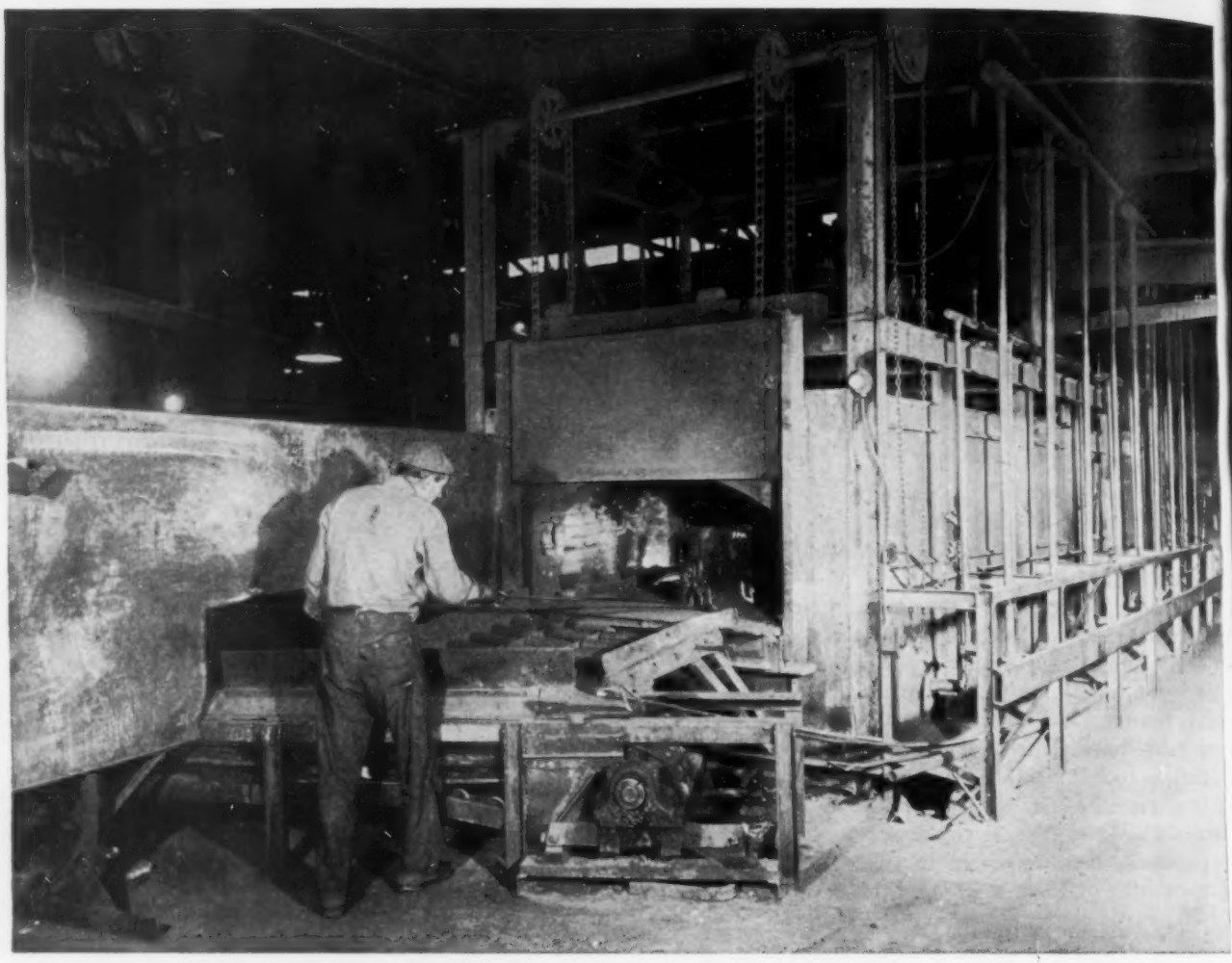
Business Better Than We Thought

Business in 1953 was better than we thought. That's the conclusion reached when studying the newly revised Federal Reserve Board Industrial Index. As well as shifting from the 1935-39 base to the 1947-49 period, 175 basic indexes are used in computation as compared to the 100 of the old system.

The new gage places heavier emphasis on hard goods and includes some brand new industries.

Superimposed graphs of both indexes would follow similar—but not identical—paths. For instance, the Oct. 1953 tally is 132 pct of the 1947-49 base while the older index showed only a 27 pct boost.

For the same month, the new yardstick indicates a dip of about 4 pct from the May-July peak of this year. The old index shows a decline of approximately 5 pct. This difference probably results from manufacturers' continuing at a fair clip—but dipping into inventories rather than buying heavily.



Though essentially put in to stop abrasion, this...

Silicon-carbide hearth cuts fuel consumption 35%

This furnace used to have a severe abrasion problem. It had a 3″-thick fireclay hearth covered by an alloy plate, and railroad I-beam skid rails. Used for preheating motor blocks, the skids had to withstand loads of up to 250 lbs. being dragged over them at furnace temperatures. The beams simply couldn't take it. They warped badly, and constantly needed straightening or replacing.

So they replaced the hearth and side tile with 2½″-thick CARBOFRAX® silicon carbide tile, and scrapped the skids and the alloy plate. The motor blocks were then pushed directly over the new floor. That was over two years ago . . . and to date *not one single* CARBOFRAX *tile has shown enough wear from abrasion to be replaced.* The only tile that have had to be replaced are a few that were accidentally cracked when blocks were tipped over on them.

The amazing 35% fuel saving referred to above, has been a corollary result of this hearth installation. The tremendously fast heat-transfer rate of silicon carbide (11 to 12 times faster than fireclay) has meant that the furnace now heats faster, easier, and more uniformly.

This new-found efficiency, added to the labor and materials saved, means real profits indeed. Our 40-page booklet gives many examples. For your free copy address **Dept. B-123, Refractories Div., The Carborundum Co., Perth Amboy, N. J.**

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Soda Cheers Tinplate Sales Outlook

West is proving ground for canned soda water . . . Bottlers report good initial sales . . . Needs lower copper content, higher tensile strength than beer cans—*By T. M. Rohan.*

Newest field for tinplate—canned soda water—is getting its first big tryout in the West. But the two western tinplate producers are currently being left behind.

Pacific Can Co.'s Los Angeles and San Francisco plants are currently shipping cans for soda water to four western beverage manufacturers. Four more are scheduled to give it a try in the next 4 weeks.

Starts Successfully . . . First to try it, Sheridan Brewing Co. of Sheridan, Wyo., has enjoyed major success with its Can-A-Pop. In Los Angeles, Cantrell & Cochrane Co. is also getting started on a limited scale on cone-type canned soda water under Walter Mack, former Pepsi-Cola president, and White Rock Soda is pushing five canned flavors.

In San Francisco, Shasta Water and Belfast, both major beverage firms, are beginning marketing. American and Continental Can Co. are starting more slowly in the West. Continental has engaged Armour Research on the corrosion problem while American is carrying on its own. About four can-making plants are being adapted by the Big Two.

Copper Is Problem . . . The two western tinplate producers, U. S. Steel at Pittsburg, Calif., and Kaiser at Fontana, are currently stymied because of high copper content in western ores. So bulk of business is going to outside firms such as Weirton. Pacific Can is using 1.5 lb coating tinplate, heaviest commercially available.

Higher acid content of soda beverages compared to beer requires low copper content Type L tinplate to prevent corrosion. Cherries, peaches, applesauce and some other western fruits pose the same problem.

Pressure Needs Higher . . . The two western tinplate producers are currently engaged in extensive research to develop methods of making Type L tinplate. Several of the many small western orebodies have been tested and preliminary results show some promise. If canned soda water goes over, the lush tinplate market will undoubtedly accelerate research into the subject.

In addition to the copper problem, tinplate for soda must have somewhat higher tensile strength to meet pressure requirements. Beer, for example, has about 2.5 to 2.9 lb pressure while soda water ranges from 2.8 to 3.2 because of higher carbonation.

Cost Margin Higher . . . The West has become the proving ground for canned soda water because generally higher prices make the slightly higher cost of cans a smaller increment. While case prices of soda in the Midwest and East average about 90¢ to $1, in the West they are about $1.35. Principal reason is lower number of bottlers per capita with resulting less competition. Increased freight distances are also a factor.

"About time he graduated from that old school he's always talking about."

Nationally, canned beer currently represents about a 4-billion-can annual consumption. If all soda water were canned, trade observers estimate consumption would hit about 28 billion cans. Firms like Coca-Cola, whose bottle has become a trademark, are expected to offer stiff competition, however.

Losses in using bottles through cost of returning, elimination of breakage and cleaning represent some saving but not enough to offset increased can costs. Bottles average out to 25-50 uses while cans are only good once.

Bliss Goes West . . . First heavy press manufacturer to put in western repair and parts manufacturing plant is E. W. Bliss, Canton, Ohio, which last week leased the year-old Moore Industrial Co. plant at San Jose, Calif. Heavy installations of mechanical and hydraulic presses, principally in Southern California aircraft plants, plus open-back inclinable units in sheet metal shops, brought about opening of the western branch, first of its kind for Bliss.

It will cut down delivery of spare parts through Moore Machinery Co. of San Francisco, California representatives, from a present minimum of about 8 days to about 2. Parts will also be stocked especially for West Coast installation rather than bucking construction schedules at Bliss home plants in Ohio and Michigan.

Plant, built only a year ago and leased for 10 years, covers 62,500 sq ft. Initial employment will be about 100 under supervisory personnel from home plants, will ultimately hit about 300. Negotiations were made a few weeks ago.

SOMEDAY . . . *it will be for real!*

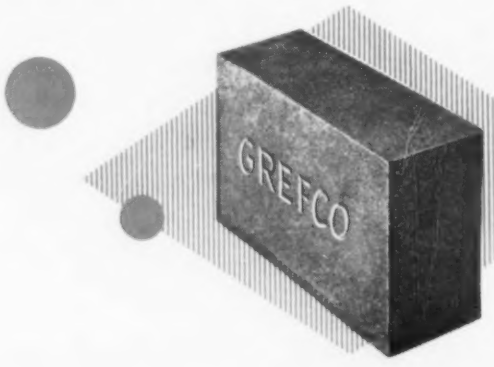
Building with blocks is as much a part of a young boy's life as baseball will be in his teens. Blocks—one on top of the other—to satisfy the typically male urge to create.

As the years roll by, this boy will go on to build bridges or buildings, to make his career in the laboratories of chemical research—or to watch steel being born from ore and earth.

Whatever his future, there will be refractory brick to help him do his job. Blocks of brick to line the furnaces and heat containing vessels—in virtually every step of industry.

There would be no processed raw materials, no production, no living such as we know it but for refractory products which Grefco furnishes in quality and quantity to keep the nation on the move.

To the boy above, a very Merry Christmas and a great many Happy and Prosperous New Years. In his hands lies the future of America.



GENERAL REFRACTORIES COMPANY
Philadelphia

Automation—More Than a Pushbutton

Automatic production does not mean management can sit back after pushing "Start" button . . . It brings many social, psychological problems—By *E. J. Egan, Jr.*

Some traffic warning signs have been posted for the benefit of manufacturers who may be planning to travel in style on the new "automation" highway to increased production at less cost. Several of these "Caution" notices were discussed at the recent annual meeting of the American Society of Mechanical Engineers, in New York.

There is no doubt that management's faith and vision in new tools and methods will continue to raise our living standards, but the concept of automatic production does not imply that everyone can sit back and relax after the "Start" button is pushed. On the contrary, as various industry spokesman pointed out, management will be confronted by many psychological and mechanical problems both before and after the advent of automation.

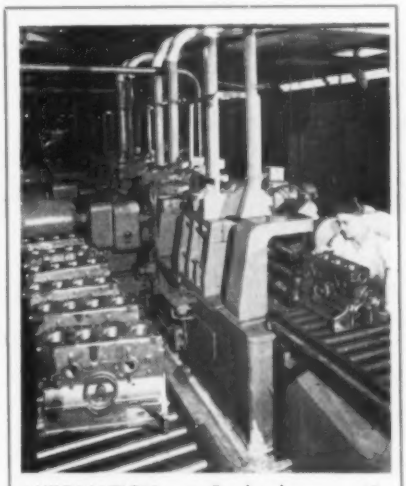
Automate Management . . . Management must undergo numerous changes to become as streamlined and progressive as its future environment, according to Charles E. Knight, plant engineer of the Plastics Div., Monsanto Chemical Co. The rate of progress toward the factory of the future and complete end-point computer control will depend on management's willingness to adapt itself to the social, psychological and technical aspects of automation.

Much greater teamwork will be required at all levels. Plant executives must be intelligent and versatile enough to work with and understand the importance of the personnel and ideas behind such functions as systems engineering, computer programming and control, and operations research.

Public Negative . . . To help promote the idea of automation, some think a public relations program should be developed by management. Public reaction to the idea of automation is mostly negative, claimed G. H. Gustat, Industrial Engineering Div., Eastman Kodak Co. He pointed out that millions of American workers believe automation will mean job dislocation and unemployment. In addition management will have to sell conservative boards of directors and stockholders on the benefits of expensive new equipment.

The threat of labor displacement could become a reality if careful consideration is not given to ways of absorbing employees into stepped up production schedules. Specialized single-industry skills are not readily adaptable to other fields.

Employees are apt to view new automation efforts with suspicion, and to minimize their objections it is suggested they be encouraged to participate in projects concerning automation.



AUTOMATION at Ford where a 13-station Cross transfer machine drills and taps tractor cylinder blocks.

Need Incentive . . . Individual operators of individual machines will, in the automation program, give way to teams of skilled technicians controlling and maintaining integrated machine units. Although the new equipment may be completely automatic, it is essential that employees have the incentive to want to make it work properly.

Selection and training of personnel will assume a more important status as automation becomes widespread. Competent technical backgrounds will be required at all levels of plant operations. The design, installation and supervision of automatic equipment calls for top-level engineers with a thorough knowledge of the principles and components involved. The current shortage of young graduate engineers must be overcome if progress is to be made.

More Training . . . Better, more comprehensive training for personnel at the technician and skilled craftsman levels is essential. Technical knowledge will replace the "best-worker-length-of-service" standard as the basis for promotion.

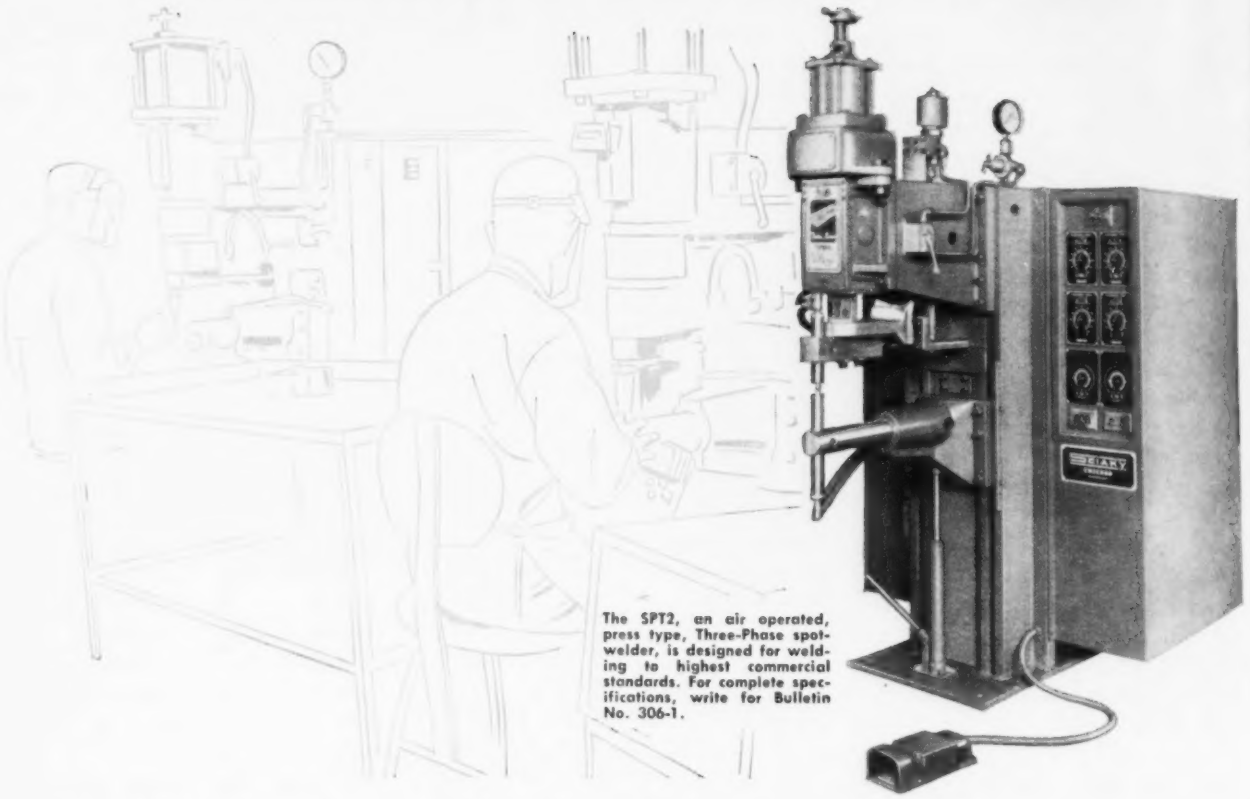
Maintenance in the automation era factory will also assume new importance. Most of it will be preventive maintenance to minimize unexpected costly breakdowns of the complex control systems and production tools. The service team in charge of this function will be under the direction of a systems engineer who will rank high in plant management.

Wherever possible, machine tool builders and other capital equipment manufacturers will attempt to ease the maintenance problem. New means of standardizing machinery will be sought and replacement packages for quick repair will be readily available. More instrumentation will be used to keep machine units and automated production lines trouble-free.

YOU CAN USE

STANDARD SPOT WELDERS

FOR SPECIAL APPLICATIONS



The SPT2, an air operated, press type, Three-Phase spot-welder, is designed for welding to highest commercial standards. For complete specifications, write for Bulletin No. 306-1.

Three Standard Sciaky Three-Phase Machines Simplify Complications of Welding Bumper Guards

Grand Rapids Metalcraft, a Division of F. L. Jacobs Co., consulted Sciaky about special machines for resistance welding two mounting brackets in automobile bumper guards. Definite requirements of strength, outside appearance, and production were complicated by limited power facilities.

After careful examination of the problems, Sciaky engineers adapted completely standard spot welders with simple tooling.

Sciaky patented Three-Phase Principle of operation with balanced line load, near unity power factor, and reduced KVA demand readily satisfied limited power facilities, where conventional single phase would not.

Not only did the strength of spotwelded assembly exceed requirements, but Sciaky Three-Phase operation eliminated need for special metal finishing.

Compared to previous method of arc welding, production soared . . . a fraction of the equipment and floor space was needed . . . three unskilled workers replaced many highly skilled men . . .

Write for the complete story of Grand Rapids Metalcraft's use of standard Sciaky welders for this job. Ask for "Resistance Welding at Work," Volume 3, No. 8.

Largest Manufacturers of Electric Resistance Welding Machines in the World

SCIAKY

4923 WEST 67th STREET, CHICAGO 38, ILLINOIS

Plants: Chicago • London • Paris Sales Offices: Chicago, Ill. • Buffalo, N. Y. • Cleveland, Ohio • Dayton, Ohio • Detroit, Mich. • Ft. Worth, Texas • Hollywood, Calif. • New York, N.Y. • Philadelphia, Pa. • Washington, D.C.

REPORT TO MANAGEMENT..

Profits dip not ominous

A slight sag but certainly not an ominous one is reflected in third quarter sales and profits of 200 corporations surveyed by Federal Reserve System. Yet, slipping profits did not prevent these companies from presenting a smiling face to investors as they paid $487 million in dividends against $485 million in the second quarter. Sales eased to $15.4 billion in the third quarter from $16.5 billion in the second while profits followed the same path. Nondurable goods industries demonstrated stability, showing tiny declines in sales and profits before taxes but higher profits after taxes.

A swipe at employment

Evidence accumulates that November's output dip took a swipe at employment. Edging to its lowest point for the month in the past 4 years, the November workweek stood at 39.9 hours--a significant sliver below October's 40.3 hours. Previously, October had rallied from a drop in September. That overtime was being pruned was obvious as November average weekly earnings of factory workers slipped to $71.02 from $71.73 in October. Meanwhile some marginal labor was sidelined and some not so marginal was furloughed as November factory employment eased to 16.7 million for a fractional dip of about 300,000 workers from October.

Construction holds firm

High caloric nourishment to 1954 prosperity will be a solid rate of new construction. November new construction spending declined less than seasonally and stood at $3 billion--with both public and private spending at new peaks. Commercial building, public utilities, road construction countered losses in other categories. November dollar volume for public and private industrial building was well below a year ago. Total spending for new construction put in place in the first 11 months 1953 was $32.1 billion,or a 7 pct gain over '52. After expenditures were adjusted for price fluctuations, physical volume of new construction gained 3 pct over 1952 for 11 months.

Industry dividends up

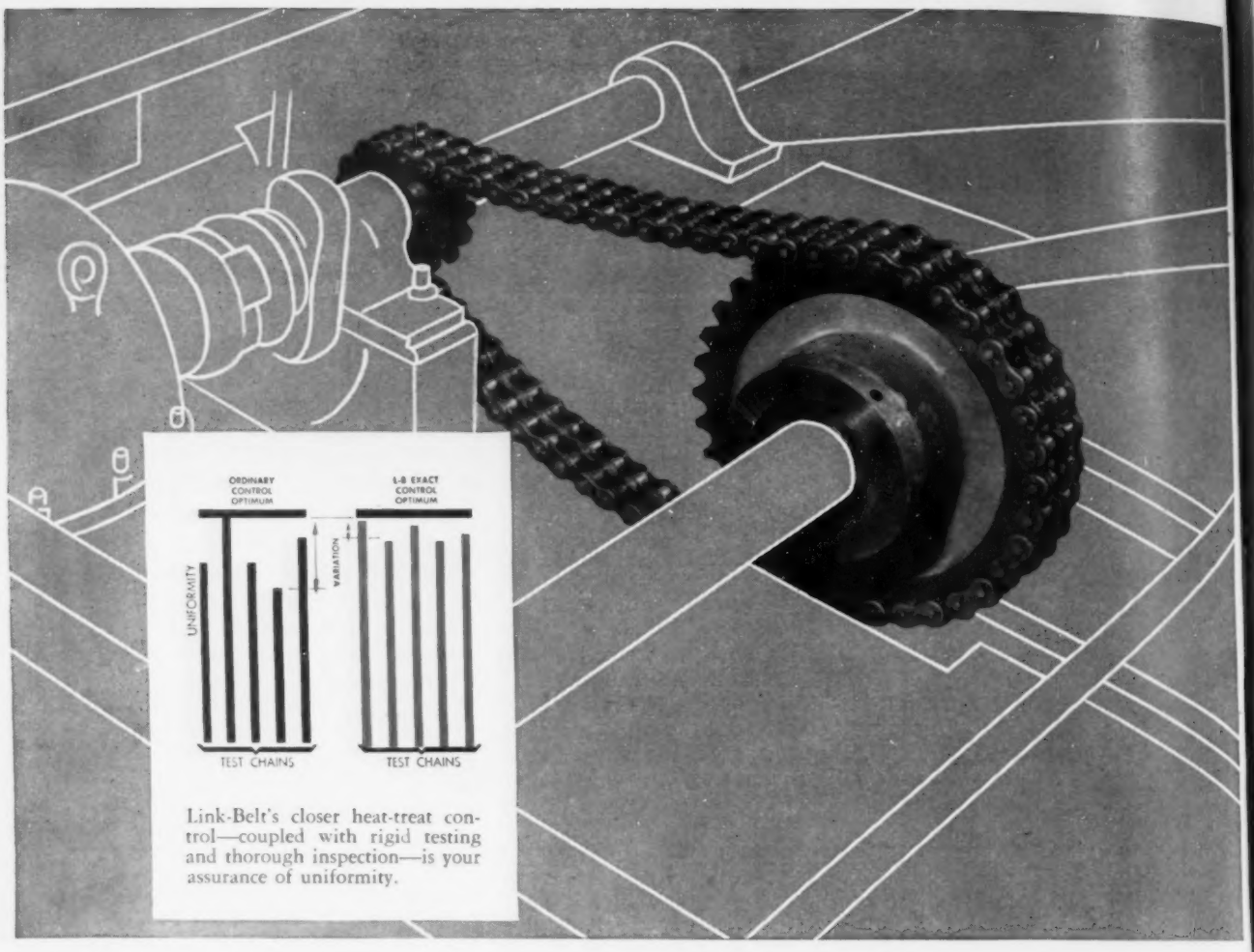
Industry in general increased cash dividend payments by 4 pct in the first 11 months 1953 over 1952--but manufacturing corporations registered only a 1 pct boost. Office of Business Economics reports November cash dividend payments at $232 million --8 pct under 1952. For nonmanufacturing industry, dividend payments for 11 months '53 were 6 pct higher than last year.

Be wise - - mechanize

The temptation of wise investment is offered by Machinery and Allied Products Institute in a study pointing out that you get a "good buy" in production equipment in comparison to wage rates and plant building costs. Ratio between equipment prices and wage rates is 23 pct lower than in 1940. Double incentive to mechanize may come next year with some easing of depreciation laws.

Hardest cut to imports

That the hardest cut of an American adjustment from boom will go to imports was demonstrated by October statistics of Dept. of Commerce. With American firms jockeying to pare inventory, October U. S. imports veered 12 pct under the average for the first 9 months and 11.3 pct below the same month last year. Meanwhile, American manufacturers were not unscathed. True, total U. S. exports rose a thin fraction in October but with military aid shipments deleted exports fell 3 pct from a year ago. For 10 months '53, non-military exports declined 9 pct while imports managed to bob up 2.8 pct. Dollarwise non-military exports were still $1 billion over imports with military aid adding another $3 billion to the total.



Link-Belt's closer heat-treat control—coupled with rigid testing and thorough inspection—is your assurance of uniformity.

Closer heat treat control means longer roller chain life!

But it's only one of many engineering extras you get from LINK-BELT

THE long-life record of Link-Belt Precision Steel Roller Chain is based on more than closer heat treat control. Consider such extra-wear features as shot-peened rollers and lock-type bushings. They're further assurance of Link-Belt's *built-in* extra life.

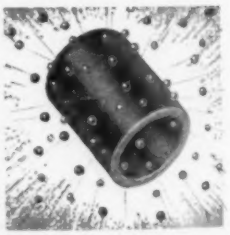
Link-Belt Roller Chain is available in single or multiple widths, ⅜″ through 3″ pitch. Double pitch, 1″ through 3″. For all the facts, call the Link-Belt office or distributor near you today, or write for Data Book No. 2457.

LINK-BELT

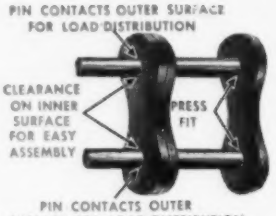
ROLLER CHAIN & SPROCKETS

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities. 13.120-A

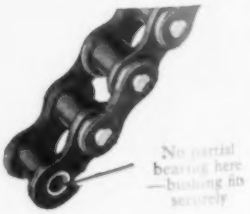
Don't overlook these other LINK-BELT extras



Shot-peened rollers have extra fatigue life for higher speeds, heavier loads.


PIN CONTACTS OUTER SURFACE FOR LOAD DISTRIBUTION
CLEARANCE ON INNER SURFACE FOR EASY ASSEMBLY
PRESS FIT
PIN CONTACTS OUTER SURFACE FOR LOAD DISTRIBUTION

Couple, uncouple multiple-width chains easily.



Lock-type bushings assure free articulation.

JET PARTS PRECISION-FORGED ON *MAXIPRESSES!*

● The forging of compressor blades and turbine buckets for jet aircraft engines demands the unparalleled ruggedness designed and built into the *new* MAXIPRES.

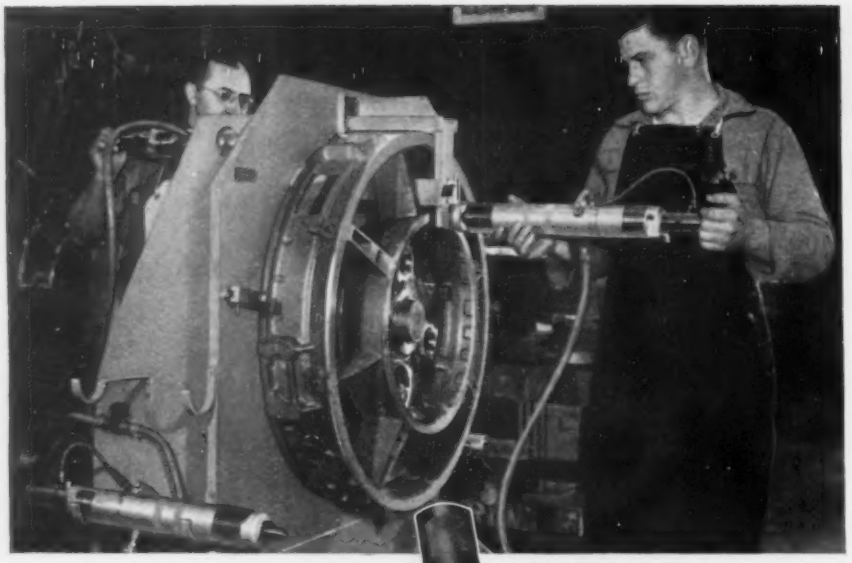
For this reason MAXIPRESSES are being chosen for the vast portion of the American, Canadian and British jet forging installations.

These fine, newly redesigned, high speed forging presses, embodying 23 new features, are specially suited to the most difficult present-day work, and by the same token will be the most reliable forge-shop equipment for future use as well.

NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO — SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

Hartford Detroit Chicago



ANOTHER EXAMPLE OF *KELLER Air Tools engineered to industry*

USE KELLER *Airfeedrills* for accurate automatic drilling

Keller Airfeedrills are recommended where extreme accuracy is needed, especially where the job cannot justify the space or cost of expensive machine tools; as in the case shown above where Keller Airfeedrills make the locating holes for machining jet engine parts . . . work which must be done to extremely close tolerances. Note the inexpensive fixture required.

Facts in Brief about **Keller Airfeedrills**

Accurate holes without costly fixtures

Attaches in any position, at any angle

Air operated—hydraulically controlled

Pneumatic cycling to speed production

Used on close centers and in tight places

Drills metal, wood, composition, plastics

Easily shifted from job to job

Keller Tool Company, Grand Haven, Mich.

Please send me a free copy of your booklet titled, "The HOLE Story of the Keller Airfeedrill."

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Send for FREE 24 Page Booklet for more information about automatic drilling with Keller Airfeedrills

—Free Publications—

Continued

Electric resisters

Four technical data sheets contain latest information on methods of using Thermistors, heat-sensitive electrical resisters with negative temperature coefficient as well as a description of new physical demonstration of permanent magnet properties. Reports include manufacturing, operating, selection and engineering assistance data. Special report on magnetic principles discusses magnetic suspension, torque control, driving and braking with permanent magnets. *Carboloy Dept., General Electric Co.*

For free copy circle No. 13 on postcard, p. 51.

Sprockets

Complete data required for purchasing roller chain and sprockets is found in new 24-p bulletin available from Dodge Mfg. Corp. Described in literature are Taper-Lock sprockets for each size chain from No. 40-100 inclusive, data on Taper-Lock bushings for the sprockets and selection data for roller chain drives. *Dodge Mfg. Corp.*

For free copy circle No. 14 on postcard, p. 51.

Broach bars

Brochure covering broach bars and fixtures for jet automotive and allied industries has been released by Cleveland Broach, Inc. Folder emphasizes speed, lower production costs and savings obtainable through the use of modern broach bar and fixture tooling. *Cleveland Broach, Inc.*

For free copy circle No. 15 on postcard, p. 51.

Gear speed reducers

New 82-p catalog supplemented by complete price list on right angle gear speed reducers is now available from D. O. James Gear Mfg. Co. Catalog contains comprehensive engineering data on four right angle gear speed reducers. *D. O. James Gear Mfg. Co.*

For free copy circle No. 16 on postcard, p. 51.

Coolant pump

Compact data and information folder on Baby Gusher Coolant pumps manufactured by Ruthman Machinery Co. gives detailed information on sizes and models of Baby Gusher for small machine tools. *Ruthman Machinery Co.*

For free copy circle No. 17 on postcard, p. 51.

MUNDT
PERFORATED METALS

The few perforations illustrated are indicative of the wide variety of our line—we can *perforate almost any size perforation in any kind of metal or material required.* Send us your specifications.

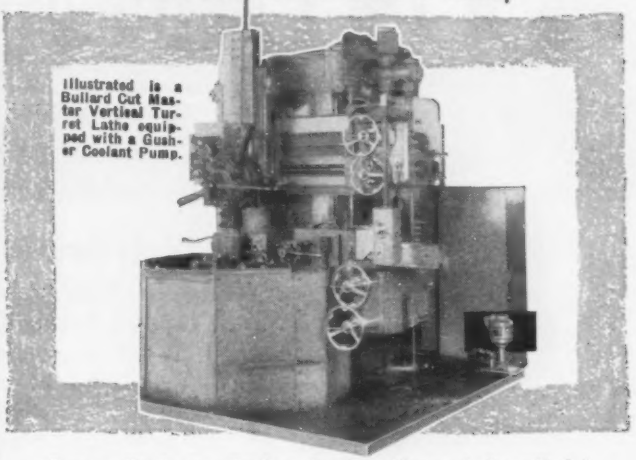
Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure satisfaction.

Write for New Catalog of Patterns

TIN, STEEL, COPPER, ALUMINUM, BRONZE, BRASS, ZINC, ANY METAL, ANY PURPOSE

CHARLES MUNDT & SONS
50 FAIRMOUNT AVE. JERSEY CITY, N. J.

Low Cost Operation
is yours with a **RUTHMAN**
Gusher Coolant Pump



Illustrated is a Bullard Cut Master Vertical Turret Lathe equipped with a Gusher Coolant Pump.

Once a Ruthman Gusher Coolant Pump is installed it requires little or no attention. The pre-lubricated heavy-duty ball-bearings require no further lubrication, there are no packing glands to adjust. The dynamically balanced rotating shaft minimizes vibration and wear. Minimum power is consumed when the Gusher is throttled down. You are sure of low cost operation when you specify Gusher Pumps on your machine.

THE RUTHMAN MACHINERY CO.
1809-1823 READING RD. CINCINNATI 2, OHIO

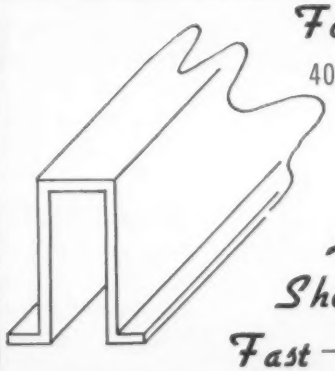
FOR SALE 12" Line PIPE
(Immediate Delivery)

44,000' 12¾" O.D. .375 Wall, 49.56# Lapweld.

All machine cleaned, straightened, 20' single random lengths, ends beveled. Used good condition #2 grade suitable low pressure pipe line service, structural columns or piling. Price $1.40 per foot f.o.b. cars trucks Grandview, Mo. or Welda, Kas.—prompt shipment—subject prior sale. Substantial quantities used 12" couplings for this pipe available at low price.

WIRE—WRITE—PHONE

HUMBOLDT-CHICAGO
PIPE LINE PROJECT
216 West Second St., Tulsa, Oklahoma Phone: 3-5400



Formed Sections
40 press brakes to 20' long
1/4" and 5/8"
to 10' long capacity

Low — COST!
Short — RUNS!
Fast — DELIVERY!

HARRISON SHEET STEEL CO.
4718 W. FIFTH AVENUE CHICAGO 44

Tabor
ABRASIVE CUTOFF MACHINES
. . . for bar stock and shapes

3-H.P. line—wet and dry cutting, bevel or rt. angle. Capacity: ¾" solids; 2" tubing; 2" x 6" lt. sheet formed sections; ½" x 1" flats.

10-H.P. line—wet cutting, rt. angle or bevel. Capacity: 2½" solids; 3" x ⅜" angles; 4½" tubing; ¾" x 3" flats. Write for literature. Specify shape, size and material to be cut.

TABOR MANUFACTURING CO.
6222 Tacony Street, Phila. 35, Pa.

W.H.O.* SAYS:

"Don't have FITS over FASTENERS, have fasteners that fit."

For the finest in milled-from-the-bar cap screws—set screws coupling bolts and milled studs

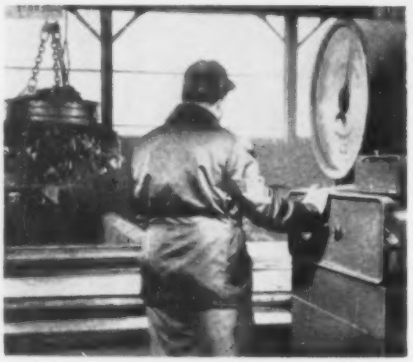
don't get stuck—stick to the ones made by

*Wm. H. Ottemiller Co. YORK, PENNA.

"I SAW IT IN THE IRON AGE,"
is a common phrase in the metalworking industry. Let the industry say it about your product.

NEW EQUIPMENT

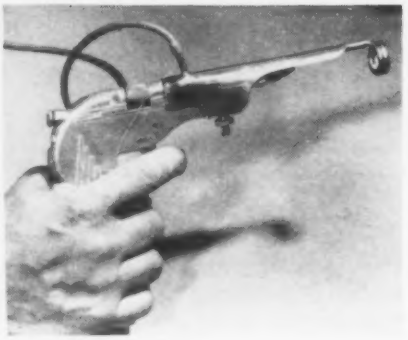
New and improved production ideas, equipment, services and methods described here offer production economies . . . just fill in and mail the postcard on page 51 or 52.



Scale-printer for on-the-job load measurements

An electronic scale and printer provides a permanent, accurate record of weighing operations on card or tape. Used in conjunction with Baldwin-Lima-Hamilton SR-4 load cells, this unit represents a flexible, compact all-electric system for on-the-job load measurement of raw materials or finished products. Contributing to the accuracy of the system is the Brown Servo amplifier system, a component part of the mechanism, that functions as a link between the electrical signal transmitted by the load cell and the printing and indicating components. The scale printer is used in the steel, chemical and manufacturing industries for crane, conveyor, platform, hopper or tank weighing. *Gilmore Industries.*

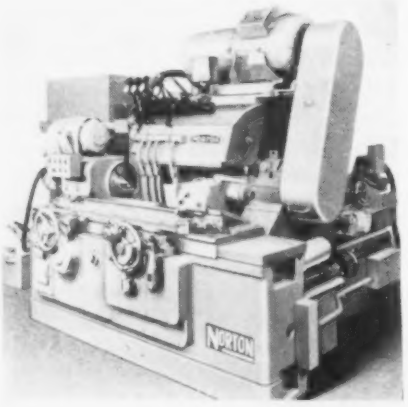
For more data circle No. 18 on postcard, p. 51.



Attachment detects halogenated gases in the air

Attachment for the Century Torch-O-Matic air-acetylene gas gun is a halide leak detector that permits quick, positive, convenient detection of halogenated gases in the air. It consists of a gasketed metal saddle, a two-turn helix of copper rod and a rubber sampling tube. When the saddle is clipped onto the gun, venturi effect produced by acetylene flowing through the gun barrel creates a vacuum in the sampling tube. Air sample drawn through the tube mixes with the acetylene and, as the latter burns, any halogenated gases present are decomposed. Products of this decomposition impart a distinctive color. *Velocity-Power Tool Co.*

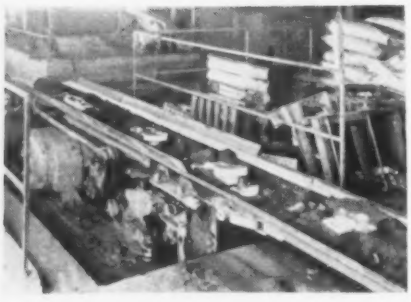
For more data circle No. 19 on postcard, p. 51.



Multiple diameters ground in a single operation

New type CM-1 heavy duty semi-automatic multi-wheel grinder is designed to make possible substantial savings in grinding parts having multiple diameters, such as transmission and motor shafts and line bearings of crank and camshafts, simultaneously in a single automatic plunge-grind cycle. This cycle minimizes operating duties, assures consistency in the high output rate by performing all grinding operations within a predetermined time. Multiple wheels, 36 in. in diam, are carried on the 12-in. diam spindle body between bearings to a maximum overall span of 30 in. including spacing collars. Heavy proportions throughout the wheel head, which moves on widely spaced 74 in. long ways, contribute to fast grinding action, fine finish and excellent wheel life. *Norton Co.*

For more data circle No. 20 on postcard, p. 51.



Shaker conveyor moves hot and abrasive materials

For conveying operations involving hot or abrasive materials, and a wide variety of other materials, a full line of shaker conveyors move materials horizontally, upgrade or downgrade for distances up to 500 ft. Several materials can be transported separately, with the feed and discharge arranged at various points along the trough. They are lightweight, portable, quickly assembled. Normal capacity is 100 tph. Troughing is from 12 to 36 in. wide x 6 to 16 ft long x 6 to 18 in. deep. *Goodman Mfg. Co.*

For more data circle No. 21 on postcard, p. 51.

The Iron Age

SALUTES

Charles R. Tyson

Never content with past performance, his look-ahead attitude boosts his firm to new highs.

BEST way to start Charlie Tyson yawning is to talk about the Brooklyn Bridge. He'll be quick to point out that John A. Roebling's Sons Corp. was paid for that job in 1869, hasn't made a nickel out of it since.

It's typical of Charlie that he prefers looking ahead, not back. As a great-grandson of the founder, he probably could have started at the top when he joined the company 18 years ago. But he decided that modern executives needed more thorough training, went to work around Roebling's openhearths and wire mills. Later he took to the road as a salesman.

Result has been an unbeatable knowledge of Roebling's more than 300,000 products. The company still builds bridges (George Washington and Golden Gate, among others), but its wire products divisions serve almost all branches of American industry.

Charlie's intensive training gave him broad understanding of a variety of management problems. Take industrial and community relations; Roebling lost only one employee to its giant next door neighbor Fairless Works. Average Roebling worker has been there 25 years.

When Colorado Fuel & Iron acquired Roebling in 1952, Charlie was asked to remain as executive vice-president, elected to CFI's board the next year. Under his leadership, Roebling will this year have the best sales in its 112-year history.

Charlie, a Princeton graduate, is a strong family man. When he's not thinking up ways to make better wire and sell more of it, you'll find him at home in Philadelphia with his wife and five children.

THE BURLINGTON LIARS' CLUB
SPINS A YARN FOR BAKER'S MAGDOLITE

FINDERS KEEPERS

After going to bed one night, a G.I. stationed in Japan, heard the barracks door open. Assuming the noise was made by some of his buddies returning, he paid no attention to it. Suddenly, two large shadows fell across his cot and he looked up. Standing beside him were two mosquitoes well over six feet tall!

Too frightened to move, the G.I. lay there petrified while the mosquitoes spoke: "Shall we eat him here or take him home?" said one. "Don't be silly", replied the other. "You know very well if we carry him home the big mosquitoes will take him away from us!"

"Finders Keepers", the title of this story, reminds us of our customers. Once they *find* out how good BAKER'S MAGDOLITE is, they *keep* ordering it again and again.

Why don't you join the long list of satisfied customers who have learned to rely on BAKER'S MAGDOLITE—the original dead-burned dolomite? Try it . . . find how its superior chemical, physical, and mineralogical composition assures ingot uniformity and reduces maintenance costs. We know you'll keep specifying BAKER'S MAGDOLITE, the dolomite which continued research has made 5 ways better: Composition, Preparation, Economy, Strength, Quality.

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JEBCO
PRODUCTS
SINCE 1889
MAKERS OF BAKER'S MAGDOLITE

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA

Plants: York, Billmeyer, Pennsylvania—Millersville, Ohio

The Iron Age INTRODUCES

James O. Flower, elected president, VULCAN CRUCIBLE STEEL CO., Aliquippa, Pa. He succeeds Stephen B. Minton, who has retired.

Eugene C. Bauer, Jr., elected president, KENSINGTON STEEL CO., Chicago; and **H. Monteith Albers,** elected vice-president.

Elwood M. Smith, appointed executive vice-president, EARLE M. JORGENSEN CO.; and **Charles Schriber,** named senior vice-president.

Harold A. Anderson, elected vice-president and assistant general manager, THE AUSTIN CO., Cleveland.

Philip R. Freeman, named executive vice-president and general manager, COULTER STEEL & FORGE CO., Emeryville, Calif.

James F. Baxa, appointed vice-president and general manager of sales, Ackermann Mfg. Co., a subsidiary of WHEELING STEEL CORP., Wheeling, W. Va.; and **George E. Martin,** becomes general manager.

James E. Fifield, named vice-president and general manager, DUCTILE IRON FOUNDRY, INC., Stratford, Conn.

G. D. Bradley, appointed to president's committee on employment of the physically handicapped, AIRESEARCH MFG. CO., Los Angeles.

W. F. Brazeau, becomes vice-president, MERCANTILE METAL ORE CORP., New York.

Alan G. Kirk, named chairman of the board and chief executive officer, MERCAST, INC., New York.

Vern Lorch, appointed technical specialist, Pig and Ingot Product office, KAISER ALUMINUM & CHEMICAL SALES, INC., Chicago.

John J. Powers, Jr., named senior vice-president, CHAS. PFIZER & CO., INC.; **Jasper H. Kane,** named a vice-president; and **Thomas J. Winn,** named a vice-president.

Russel A. Schell, appointed director, Accounting Research, THE NATIONAL SUPPLY CO., Pittsburgh.

Dr. Matthew W. Miller, appointed technical director, Coated Abrasives & Related Products Div., MINNESOTA MINING & MFG. CO., St. Paul; and **John A. Reese,** promoted to sales manager, industrial and hardware paint trades, same div.

Dave Wooster, appointed works engineer, BASIC REFRACTORIES, INC., Gabbs, Nevada.

Peter R. Letcavits, appointed general superintendent, REPUBLIC STEEL CORP., Cleveland strip mill.

Lawrence A. Gerber, joined the Sales Engineering Staff, HONAN-CRANE CORP.

John E. Marsh, appointed sales engineer, THE HERR EQUIPMENT CORP., Warren, Ohio.

Charles H. Squarcy, appointed superintendent, Blast Furnace Dept., Indiana Harbor Works, INLAND STEEL CO., Chicago.

Gerard T. Shannon, appointed managing engineer, Industrial Engineering Dept., WALTER KIDDE CONSTRUCTORS, INC.

Arthur Schroeder, named southeastern application engineer, WARNER ELECTRIC BRAKE & CLUTCH CO., Beloit, Wis.

Gifford M. Randall, placed in charge of development work, KAISER ENGINEERS, Oakland, Calif., headquarters.

M. F. MEISSNER, appointed vice-president for operations, Olin Industries, Inc., East Alton, Ill.

N. H. COLLISSON, appointed vice-president, Operations, Olin Industries, Inc.

H. A. ROWBOTHAM, elected vice-president, Phoenix Bridge Co., Phoenixville, Pa., subsidiary of Barium Steel Corp.

G. D. Gillen, appointed assistant manager, New York District office, DETROIT STEEL CORP., Detroit.

Sumner S. Howard, named manager, National account Sales, A C Spark Plug Div., GENERAL MOTORS.

John J. O'Brien, appointed manager, Industrial Engineering Dept., THE TRANE CO., LaCrosse, Wisconsin.

Joel H. Watkins, appointed sales manager of transformers and allied products, KUHLMAN ELECTRIC CO., Bay City, Mich.

William J. Brigham, appointed district manager, Cincinnati office, Steel & Tube Div., THE TIMKEN ROLLER BEARING CO., Canton, Ohio.

John Segrave, promoted to assistant sales manager, Rolled Steel Products Div., EMERGENCY STEEL SERVICE, Skokie, Ill.

H. O. Proske, named national representative specializing in gas meter sales promotion, ROCKWELL MFG. CO., Meter & Valve Div.

Roy W. Vorhees, appointed to newly created post of supervisor of Product planning and estimating, Dodge Div., CHRYSLER CORP., Detroit.

Melvin B. Monson, appointed assistant manager, Milwaukee steel service plant, JOSEPH T. RYERSON & SON, INC.; and **W. F. Kurfess**, continues as manager.

Edward A. Murray, appointed Detroit district manager of sales, American Steel & Wire Div., U. S. STEEL CORP., Cleveland.

Richard A. Villacres, appointed Minnesota district sales manager, WILLIAMS STEEL & SUPPLY CO.

Edward A. Murphy, named sales manager, LEHIGH STRUCTURAL STEEL CO., Allentown, Pa.

Paul K. Lambert, named traffic manager, FOOTE MINERAL CO., Philadelphia.

Adelbert H. Loux, appointed general sales manager, FLEXIBLE TUBING CORP., Guilford, Conn.

R. A. RICHARDS, appointed manager, Bonding Materials Div., Bakelite Co., New York.

JOSEPH POMMERSHEIM, promoted to chief engineer, Rockwell Mfg. Co., Norwalk, Ohio.

A. J. SNYDER, named sales manager, Cutting Tool Sales Div., The Motch & Merryweather Machinery Co.

JOHN J. LITTLEY, appointed assistant sales manager, Hydraulic Press & Power Tool Dept., Baldwin-Lima-Hamilton Corp., Philadelphia.

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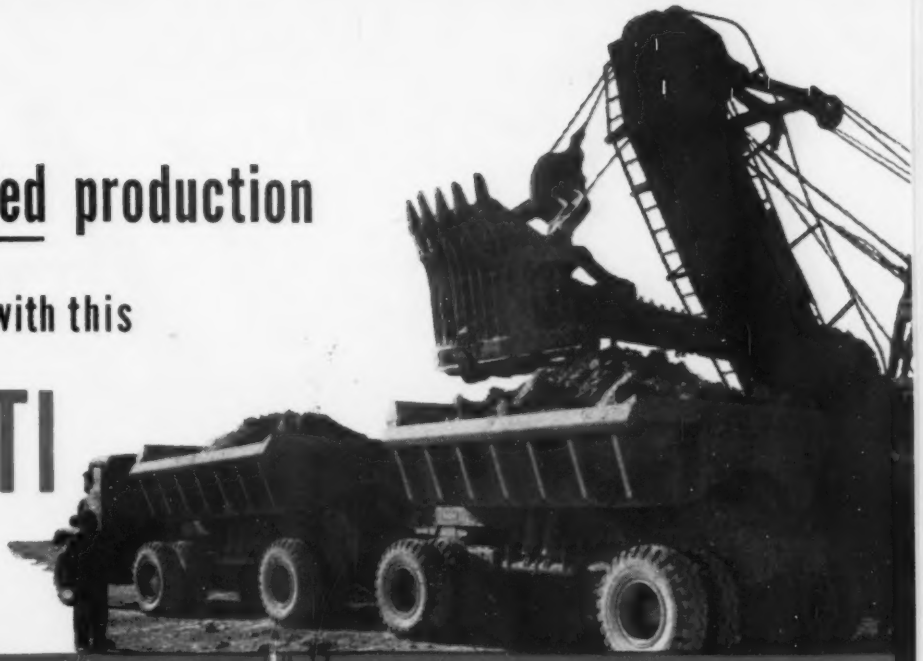

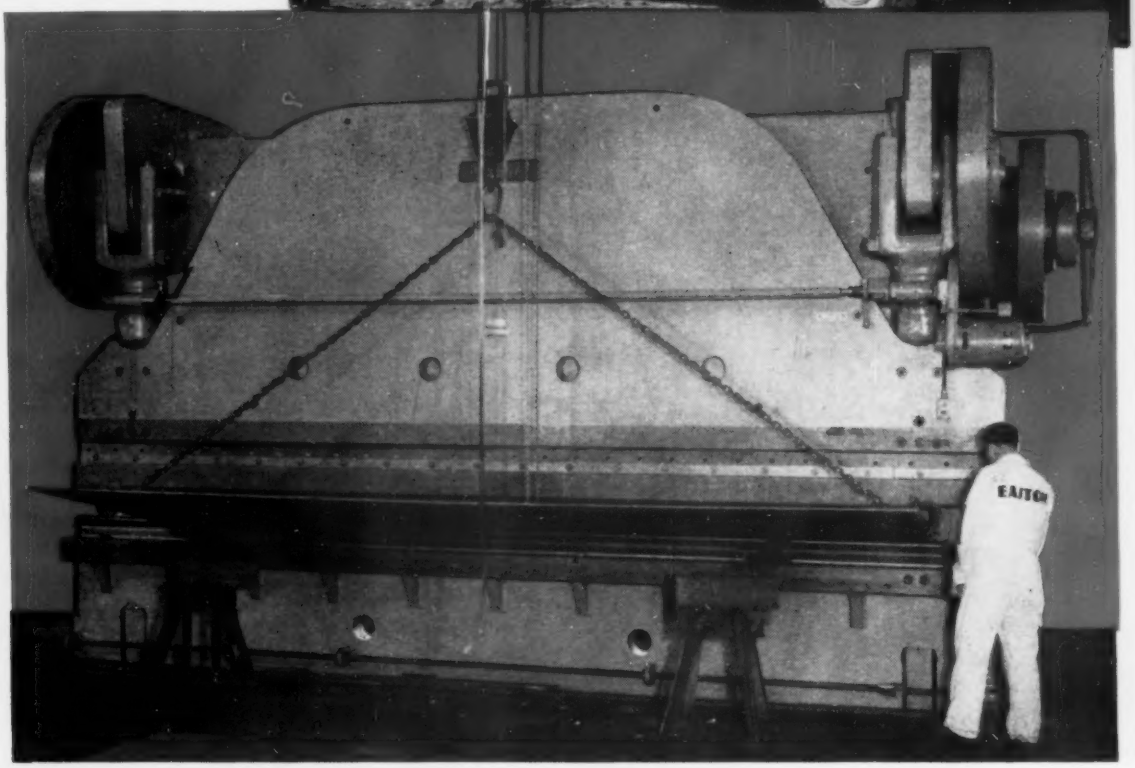

Illustration courtesy Easton Car & Construction Company, Easton, Pennsylvania.

Here a Cincinnati Press Brake is forming ½" plate for wide sections of off-highway trailers, at the Easton Car & Construction Company, makers of a large line of products for industrial transportation.

By using this Cincinnati Press Brake, some welding operations were eliminated, which improved the product, and reduced production costs at the same time.

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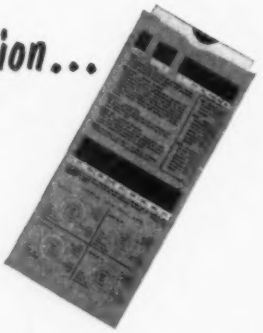

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Personnel

Continued

John S. French, appointed assistant general manager, FORD MOTOR CO., Parts & Equipment Manufacturing Div., Dearborn, Mich.

J. A. Jean, appointed sales manager, FRAY MACHINE TOOL SALES CORP., Glendale, Calif.

Donald L. Harwood, appointed general purchasing agent, FAIRBANKS-MORSE & CO., Chicago.

Jack L. Mustard, appointed assistant general sales manager, Industrial Div., EX-CELL-O CORP., Detroit.

R. Louis Rougemont, joins plastics division as a consultant, JACKSON & CHURCH CO., Saginaw, Mich.

Ronald P. Montgomery, appointed purchasing agent, Rockwell Meters, Inc., subsidiary of ROCKWELL MFG. CO., Pittsburgh.

Andrew Wassell, named sales representative, Charlotte District office, ALLIS-CHALMERS MFG. CO.'S General Machinery Div.

Charles A. Tuchschmidt, appointed Arizona sales representative, ZIEGLER STEEL SERVICE CORP., Los Angeles.

Harold G. Williams, named representative, PENN PRECISION PRODUCTS, INC., Reading, Pa., in the Metropolitan New York area.

Carl Clogston and **Wayne Dabb,** appointed sales representatives, San Francisco sales district, ACME STEEL CO.

OBITUARIES

J. Walter Jeffrey, 73, former vice-president and director, Jeffrey Mfg. Co.

Chester I. Hall, 65, retired engineer, General Electric Co., in Boston, Mass., where he had been undergoing medical treatment.

R. F. Feind, 64, a special engineer, Processing Machinery Dept., Allis-Chalmers Mfg. Co., Milwaukee.

Vernon R. Hill, superintendent, Cold Rolling and Annealing and Pickling Depts., Washington Steel Corp., Washington, Pa., recently.

INDUCTION HEATING: Low Frequencies Have Advantages

By J. A. Logan
President
Magnethermic Corp.
Youngstown

◆ Use of low frequency induction heating equipment for ferrous and nonferrous applications is growing . . . A big advantage is low first cost of equipment . . . Now induction heating can be used in applications previously considered impractical because of the cost of high frequency motor generator sets.

◆ Steel billets 6 in. in diam are preheated from room temperature to 2300°F in 5 minutes . . . One unit preheats a 6000-lb aluminum billet to extrusion temperature in 35 minutes . . . Because of the speed of heating, close accurate control of power is built-in.

◆ Penetration of heat energy is greater than with high frequency induction heating . . . The 3-phase heater draws a balanced load from the electrical circuit . . . Accurate, uniform temperatures obtained throughout billets help improve quality of extruded products.

◆ RECENT IMPROVEMENTS in low frequency induction heating equipment have opened new fields for application of induction heating in the metalworking industry. With its lower first cost, the method can now be used for many jobs where the cost of high frequency motor generator sets previously prohibited use of induction heating.

Initial developments in nonferrous heating were made on aluminum billets. These developments were then adapted to magnesium, copper and brass. As early as 1947 the demand for aluminum extrusion products was far beyond the ability of existing fabricating facilities. Since both aluminum and the machines for extruding it were commercially available, the logical move for a fabricator was to expand his operation to include extrusion.

One bottleneck in the extrusion process was billet preheating. Furnaces then used were not sufficiently adaptable to the extrusion process. The door was open to a new furnace development, and 60 cycle billet heaters proved to be the answer to the problem.

The polyphase heater developed by Magnethermic engineers, normally operated on 2 or 3-phase power, draws a balanced load from the electrical system and provides a uniform heat pattern on all high thermal conductivity metals. In the case of a 3-phase supply, the coil is

Aluminum and magnesium billets to 32 in. in diam and 80 in. long are easily handled . . .

usually split into three sections with each portion connected to one of the three phases of the electrical system.

This connection is normally made through a suitable furnace transformer tapped to control the input to the coil sections. Power input to the coil sections may be individually controlled, and the piece being heated may have complete temperature uniformity or an axial temperature gradient. The latter case is not uncommon in the extrusion of aluminum alloys. Heat generated in the extrusion process causes the rear of the billet to overheat, resulting in uneven properties throughout the length of the extrusion. A temperature gradient may be established in the billet along its axis which will compensate for heat buildup and result in an extrusion of more uniform quality.

Requires close control

One disadvantage of early polyphase coil designs was the lack of magnetic flux uniformity in the area between phases. Coils have been developed that will compensate for the difference and provide a uniform flux pattern. Over 80 heaters are now in service embodying this feature.

Induction heating, because of its high speed, requires extremely accurate control of power. When dealing with low frequency induction heating, the penetration of heat energy is much greater than in the case of high frequency heating. Heating time for any given piece of metal is less than when using high frequency heating. This places an even greater emphasis on accurate temperature control. In the case of aluminum and magnesium, this is accomplished by the use of an open prod type thermocouple which is firmly pierced into the billet, completing the circuit through the metal piece.

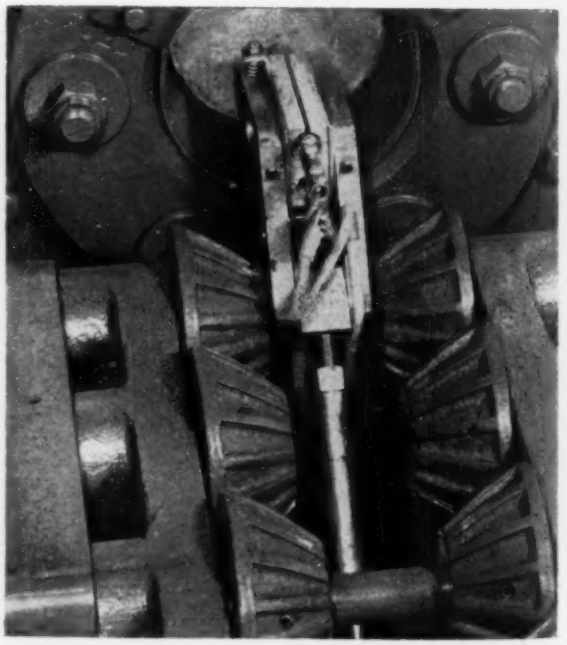
Billets positioned in coils

This type of couple is extremely rapid in response, and when connected to a high speed electronic controller, provides an excellent means of shutting off and controlling power after a billet has been heated to a predetermined temperature. This prod may be used on the end face of the billet, or may be injected through the side of the coil. Since 3-phase induction coils tend to force a billet out of the coil, this thrust may be controlled so that the billet is always forced towards one end of the coil. A removable billet stop may then be provided to hold the billet in position and also to position the thermocouple. This stop assembly retracts to permit unloading the heated billet.

Recent developments have resulted in design of low frequency heaters to handle aluminum and magnesium billets up to 32 in. in diam and over 80 in. long. These billets will be used in the large extrusion presses currently being manufactured for the U. S. Air Force heavy press program. Most of the heaters are of vertical coil construction to take the weight of the billet off the coil. Other than this, the electrical circuit is similar to circuits in existing heaters. A single heater of this type will preheat a 6000-lb aluminum billet to extrusion temperature in 35 minutes. This compares favorably with a conventional hot air heater wherein the heating time is approximately 14 hours.

Preheating copper and copper base alloys poses several problems not encountered in aluminum billet heaters. These include wide variations in electrical resistivity and also variations in the thermal conductivity of the metal. Since most brass heaters are rated in excess of 500 kw, it becomes practical to build these heaters utilizing three, single phase heating coils. These coils can be designed with taps and adjustable billet stops so that proper coil overlap can be maintained when heating various alloys of varying billet lengths. A typical brass billet heater is rated 1000 kw and will heat approximately 10,000 lb of metal per hour. Temperature range is from 1300° to 2100°F.

Temperature control in this range is not readily accomplished with thermocouples. Radi-



REMOVABLE BILLET STOP holds billet in position within coils. Stop assembly retracts to unload.

ation type instruments provide effective temperature control. Existing heaters are designed to heat 8 in. diam brass billets to 1600°F in 3 minutes. The radiation instruments prov.de accurate response at these heating speeds with no noticeable instrument lag.

Axial temperature uniformity depends greatly upon the amount of coil overlap on the ends of the billet. Too little overlap results in cold ends and an overheated section. Too great an overlap causes overheated billet end sections and a cold center. Further, this condition varies with the alloy used.

In order that billets of varying length and alloy content might be properly located in the coil, the billet stop is adjustable. This provides the necessary adjustment on the discharge end. The other end of the coil is provided with taps which are readily connected by flexible jumpers to the furnace transformer. This arrangement provides an infinite number of positions within the coil and makes it readily practical to achieve absolute temperature control. These settings may be initially determined when the heater is installed and used thereafter.

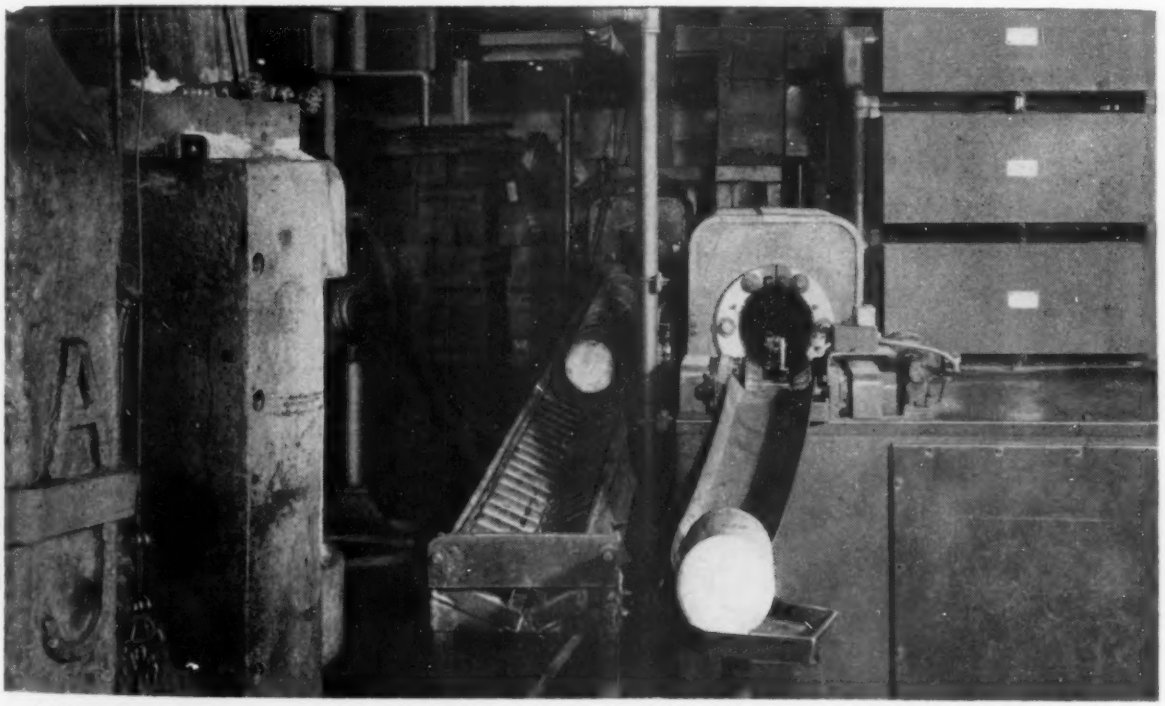
Probably the outstanding development in 60 cycle induction heating in recent years has been a billet heater for steel extrusion presses. This heater will preheat both carbon and stainless steel billets 5 in. in diam or larger to 2300°F, without use of high-frequency generating equipment. The same equipment may be used with equal success on titanium and its alloys. Tonnages involved in such an installation are relatively large, and until the advent of this heater, induction heating was not even considered, because of equipment first cost.

Billet condition in the hot steel extrusion process is extremely critical. Whether it be carbon or stainless steel, it is extremely important that billets be heated to terminal temperature absolutely scale free. Scale formed during heating damages extrusion dies and also may mark or score the extrusion. Most steel extrusion is currently devoted to stainless steel tubing. This requires very accurate temperature control. Unequal billet temperature results in uneven pressure distribution in the press chamber, deflection of the press mandrel and a tube having an eccentric hole in it.

How flux leakage is corrected

The conditions that exist in coil design for brass billet heaters are also present in steel heaters, but are more critical. End effect is far more pronounced in the heating of steel than in brass. The requirement for coil overlap is so great that it becomes necessary to resort to other means to correct for flux leakage at the end of the billet. This is accomplished by placing flux diverters in the ends of each coil. These tend to cause more flux to travel through the end of the coil without loss of efficiency, and reduce the requirement for coil overlap considerably.

Tests showed induction heated extrusion billets produced good extrusions. Addition of an inert gas in the heating coil to displace oxygen provided an extrusion quality heretofore unobtained. These tests were run on a



ALUMINUM INGOTS, at rate of 8000 lb per hour, are fed to this upsetter from two 500-kw billet heaters in forge shop of aircraft engine maker. Rollers, slides simplify handling.

2500-ton steel extrusion press at Babcock and Wilcox in Beaver Falls, Pa. Tests over a period of several months consisted of heating and extruding stainless steel billets under varying conditions. Heating speeds were varied and effects of inert gases studied.

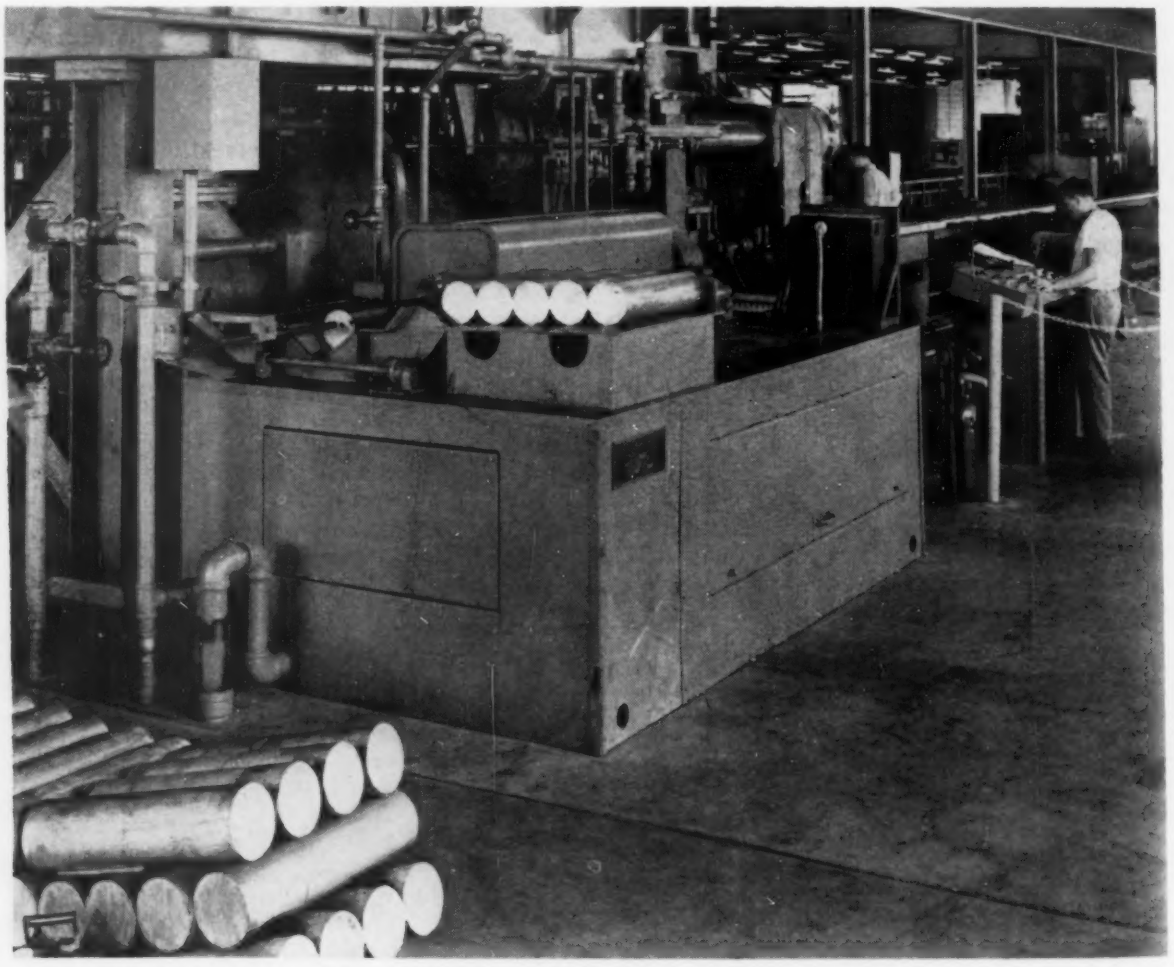
Production units of steel billet heaters are currently under construction and should be in operation by January, 1954. Usually three or more heaters are grouped in a single assembly. Billets are fed from a horizontal magazine, one at a time, into an upender, upended and hoisted into the coil. The top assembly in the coil consists of a Rayotube for temperature control, inlet pipes for gas injection and the upper flux diverter. This assembly is readily adjusted upward and downward for varying billet lengths. The lower flux diverter forms an integral part of the coil hoist platform.

Such heaters can preheat steel billets 6 in. in diam from room temperature to 2300°F in 5 minutes. Main components, in addition to the coil assembly, include the heater transformer, mounted in a compartment adjacent to the coil, and the main contactor and capacitor assembly usually mounted remotely. Steel and brass heaters, now in service or under construction, usually operate on 2300 or 4160 v. However, any voltage in the range of 440 to 4800 v may be used.

In addition to the unit outlined, carbon steel heaters now being built utilizing two stage heating both in single and dual frequency. Electrical heating characteristics of carbon steel change radically at the Curie point (about 1300°F) and it is desirable to use separate coils for heating up to and beyond that point. Depending upon billet size, the final heating coil may be any frequency from 50 to 10,000 cycles. The larger the diameter, the lower is the required frequency.

The most efficient operating frequency for high temperature steel heating is a function of diameter of the piece to be heated. The induction heating industry commonly uses 10,000, 3000, and 1000 cycle generators, and line freqency.

Occasionally, optimum frequency is between 60 and 1000 cycles. Under these conditions, the lower cost 60 cycle heater at slightly reduced efficiency must be weighed against the higher cost 1000 cycle unit at slightly increased efficiency. The picture may be further complicated by the entry of a third frequency in the 540 cycle range. This is not now an industry standard but is worth consideration.



BILLET HEATER, rated at 625kw, is used to feed heated billets to 2500-ton extrusion press.

◆ Five zinc alloy die casting machines produce wide variety of parts for International Harvester tractors at the company's Chicago plant . . . Economy and efficiency result from close supervision and quality control.

◆ Trimming of gates and flash, plus other finishing operations, is done by the most efficient method . . . Hydraulic presses do gear trimming and shaving . . . Tumbling barrels remove light flash and machining burrs . . . Grinding is done on many castings.

Versatile Setups Finish Diecastings Faster

By Frank E. Beers
General Foreman, Die Cast Dept.
Tractor Works
International Harvester Company
Chicago, Ill.

◆ COST STUDIES made by the Tractor Works of International Harvester Company, Chicago, have demonstrated that a separate department for producing zinc alloy die castings could effect marked economies.

This department now has five machines in operation, including three No. 2 Reed-Prentice models, one Kux machine and one Kipcaster, the latter for small parts only. With this variety of equipment, dies up to 24 in. square can be used. Many somewhat smaller dies are used also in the Kux and Reed-Prentice machines.

Only zinc alloy is employed, since it is easy to cast, has high strength, is low in cost per casting and serves well in the diverse applications for which the die castings are used. About 12,000 to 13,000 lb of zinc alloy is consumed per day when this department is operating at full capacity.

Castings produced include bearing seal retainers, governor throttle shaft housings, carburetor parts, some spur gears and many small components for tractor applications.

All the machines use hydraulic plungers and nitrogen bottle accumulators. Each has its own gas-fired furnace and each is also a self contained unit having its own hydraulic pumps and controls. All melting is done in machine furnaces using prealloyed ingots, gates and sprues. Furnaces have automatic thermostats to hold the zinc alloy at substantially constant temperature.

In the Kipcaster, which uses only small dies, the dies are opened, closed and locked by hand and foot control. Metal injection is effected by compressed air from a 90 psi shop line. Though designed only for small castings, this machine has a fairly high operating rate.

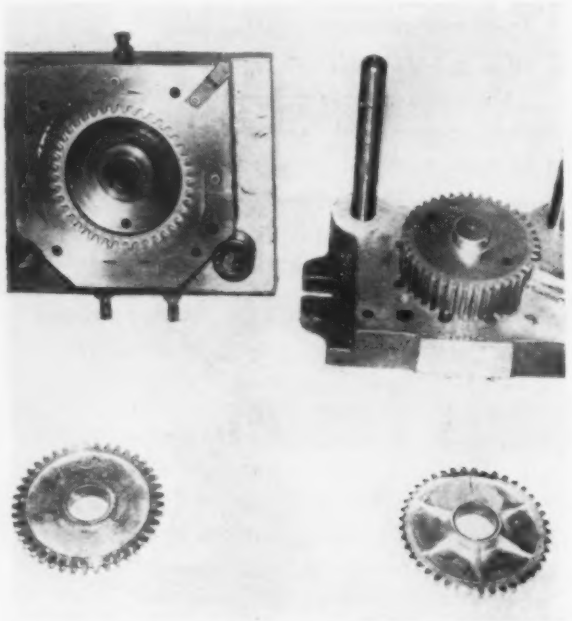
The Kipcaster is used especially for casting fittings onto the ends of short lengths of metal hose. The hose lengths serve as inserts, and hand inserted cores keep the metal from entering the bore of the hose. This method, thought to be unique in this shop, has proved to be exceedingly useful and economical. It produces and applies each fitting in a fast operation and saves the cost of applying special fittings by hand.

Use of the larger machines follows conventional methods. They employ rams of 3 to 3½-in. diam. Hydraulic pressures applied to the rams are so adjusted that injection pressures average about 900 psi. This is sufficient to produce good castings at rates up to about 300 "shots" an hour when hand placed inserts are not required. In one 20-cavity die used on the

"All operations in the die casting and finishing departments are subjected to regular statistical quality control . . ."

Kux machine, as many as 3320 small castings per hr are produced.

Certain dies, including some with two cavities, have hydraulic cylinders attached. These operate core pullers automatically from the hydraulic system of the machine, with pulls up to 7 in. being made. All four of the large machines are also equipped with pushouts that operate automatically as dies are opened.



COMBINATION TRIMMING and shaving die for 6-in. zinc alloy spur gear shown in foreground. The casting gate is milled off flush with the gear face before trimming and shaving.

In keeping with the efficient methods of producing the castings are those provided for handling supplemental operations. These involve trimming off gates and flash, as well as grinding and other finishing work commonly required on die castings.

All die trimming of flash is done on two hydraulic Denison Multipresses. This type of press does excellent work and is safe.

Among the somewhat unusual trimming jobs done on the Denison equipment is one performed on a 6-in. spur oiler gear, using the die shown in the photograph. This die not only removes the flash but shaves all of the gear teeth in one stroke. Shaving the gear teeth removes the draft provided in the gear to permit ready ejection from the casting die cavity. Flash occurs at the die parting on the flat face of the gear, which is cast with a bushing insert in the hub.

As photographs indicate, the female shaving portion of the die is its upper, movable half. The lower die half is a gear of the same size and pitch as the gear trimmed. Before trimming is done, the gate, which is on the parting face of the gear, is milled off flush

AN 8-TON HYDRAULIC PRESS trims flash from die-cast spur gears and simultaneously shaves gear teeth at a rate of about 331 pieces per hr. Gear is cast with bushing insert in the hub.

with this face. When the gear is placed on the lower die, the central bushing locates the casting centrally over a pin. Angular location is by a single external retracting tooth that meshes with the space between two gear teeth as the gear is placed in the die. This tooth brings the gear teeth of the casting in line with those of both upper and lower die sections.

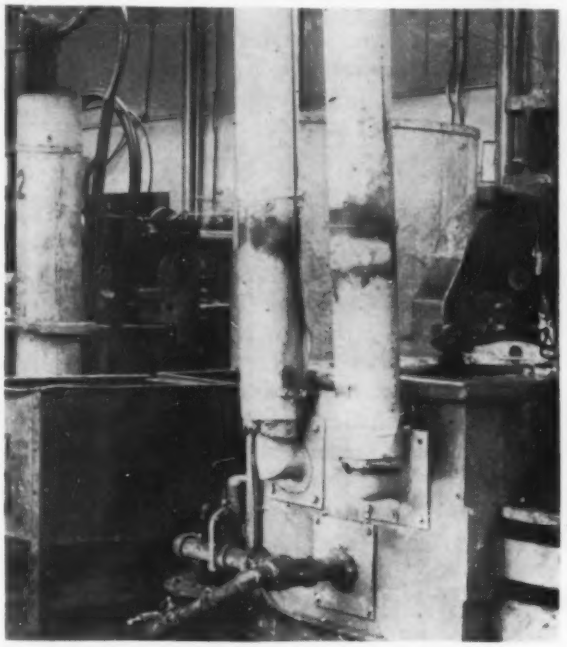
As the press is closed, the shaving die moves downward over the casting. Chips remain below the shaving die and are blown off by an air jet. On the return stroke of the press, a sleeve around the press ram strikes the casting, pushing it back through the shaving die so that it remains on the lower die section. The trimmed and shaved gear is lifted off just before the next rough casting is put in place. About 331 gears an hour are processed in this setup.

Off-hand grinding is done to remove flash from castings when this method proves to be more economical than die trimming.

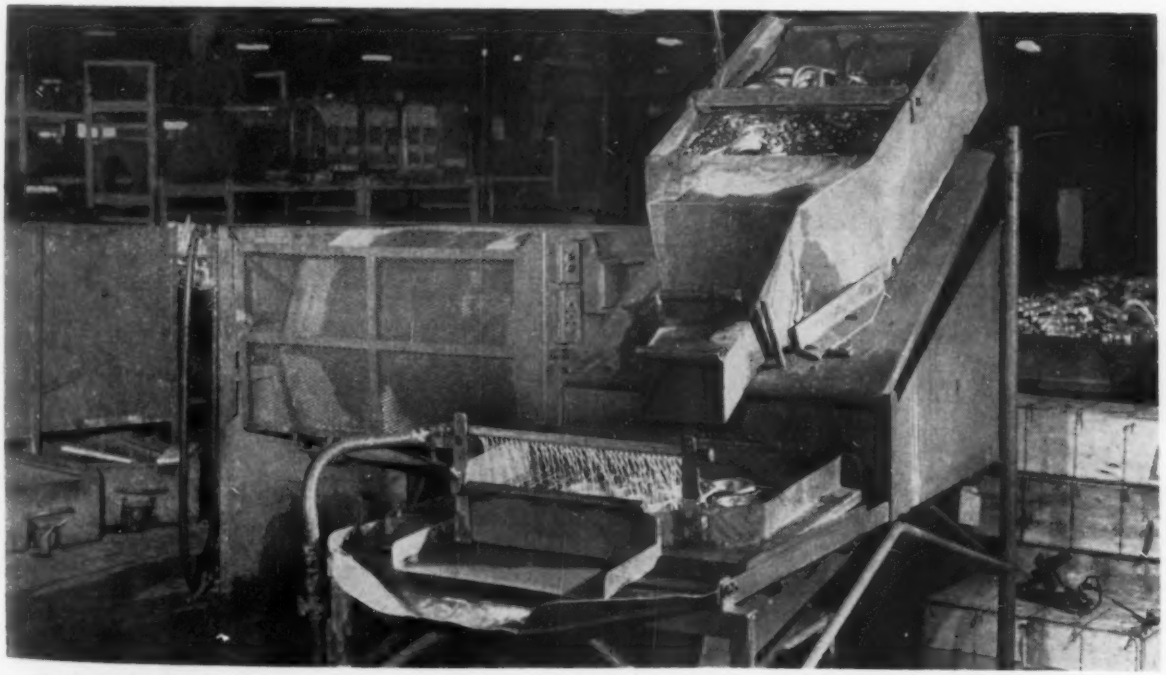
Roto-Finish equipment, including a two-compartment rubber lined barrel, is frequently used to remove flash and burrs left from machining operations. Die castings are handled through the barrel in bulk lots. A typical charge per compartment includes about 700 lb of castings, an equal weight of granite chips, 2 lb of No. 115 Roto-Finish compound.

In this setup, the barrel rotates at 22 rpm. Time of tumbling depends largely upon the type of fins or burrs to be removed. The wet tumbling medium does rapid cutting but does not injure the castings. When tumbling is completed, barrel compartments are flushed out with water. The contents are dumped into hoist pans where they are fed onto a shaker screen. The granite chips drop through the screen while the castings remain on top.

All operations in the die casting and finishing departments are subjected to regular statistical quality control. An inspector checks each operation at least once an hour. If quality standards are not being met, prompt steps are taken to remedy the difficulty.



PART of die casting machine line at International Harvester's Tractor Works in Chicago which uses 12-13,000 lb of zinc alloy per day to produce large volume and wide variety of parts.



FINISHING SETUP wet tumbles zinc die castings with granite chips to remove fins and machining burrs. After tumbling, shaker screen in foreground separates chips from castings.

Less Maintenance—

New Corrosion Resistant Coating

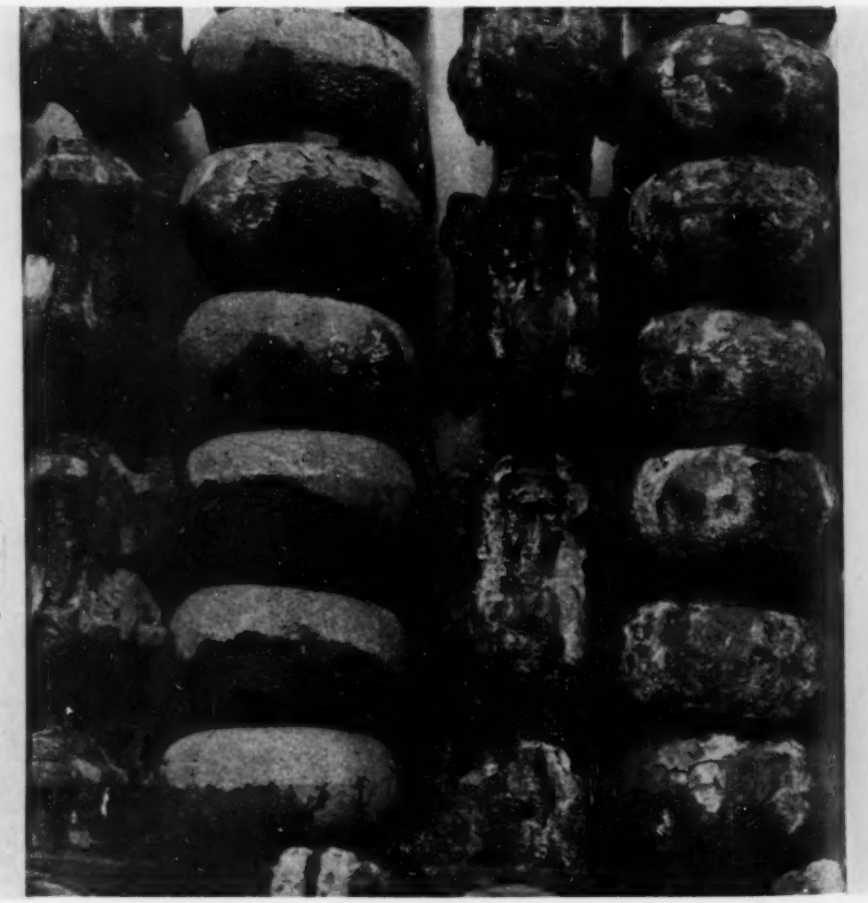
J. J. Obrzut
Metal Finishing Editor

- Cooling and condensing sections are being protected with a special aluminum coating . . . Coating is a mixture of aluminum powder in a special plastic vehicle.
- It must be applied to surfaces which have no traces of scale or oxidation . . . Savings from one thorough cleaning operation will pay for the cost of the coating.

◆ THE ENGINEERING STAFF of The National Radiator Co.'s Heat Transfer Div. is continually investigating developments which might extend the service life or the efficiency of its cooling and condensing sections. Such a development has been under test for several years now and the results are exceptionally promising.

Users of heat transfer equipment in areas where water is salt, acidic, contaminated or otherwise corrosive will be interested in test findings with respect to a new product called Kolmetal, developed by Emjay Maintenance Engineers, Rutherford, N. J. The Kolmetal coating is a mixture of finely pulverized aluminum powder in a special plastic vehicle. The metallic particles comprise about 85 pct by volume of the mixture. The resultant plastic bonded aluminum coating maintains its heat transfer efficiency while resisting corrosion. The plastic base completely seals the metal particles to make a tightly bonded, flexible and adherent coating.

These properties are particularly important to the operation of a compact cooling and condenser unit with high thermal effectiveness and efficient



TWO SETS of acid cooling coils show how Kolmetal-coated coils, left, were protected while, at right, corrosion set in.

Protects Cast Iron Coolers

utilization of water. In addition, because of the abrasion and impact resistance of the coating, the sections treated can be shipped, crated, erected, and otherwise handled in the same manner as untreated sections.

The coated sections now under test in contaminated salt water with pH between 4 and 5 have an operating history of over 3 years. Previous experience without coating in this exceptionally severe service require extensive cleaning operations at the end of 2 years in order to restore efficiency. This was due to the unusually heavy oxide and organic slime deposits. On the other hand, with Kolmetal coating, the same cooler remained clean and corrosion free during the same period of time under identical severe conditions.

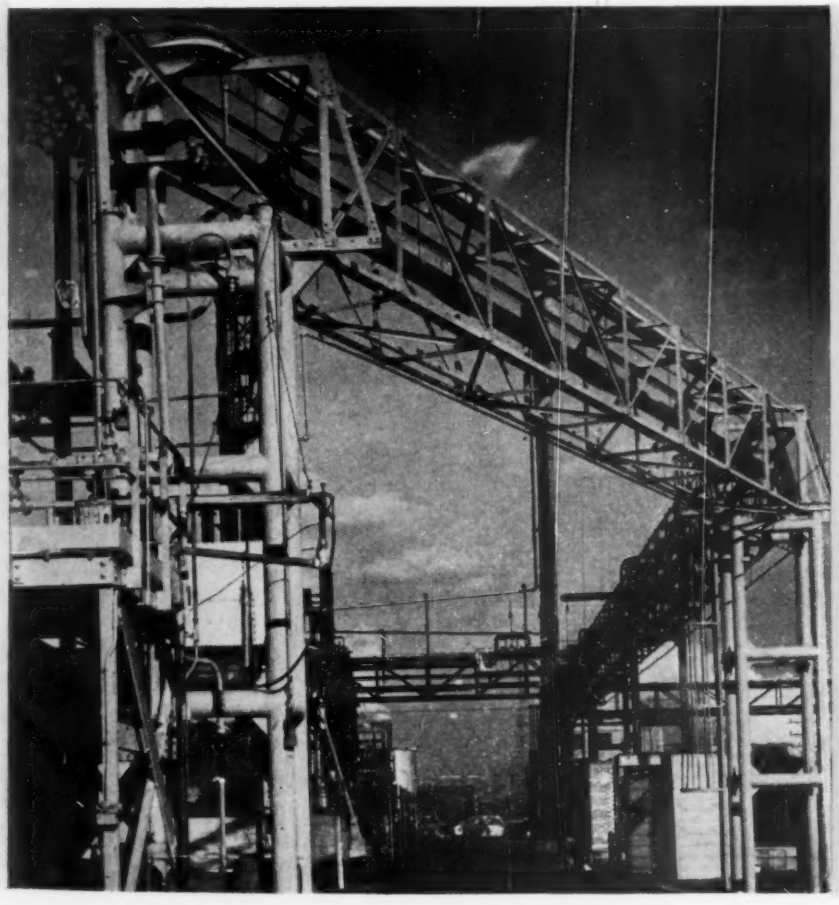
Costs less than cleaning

All indications are that the cost of applying the coating is less than the cost of a single cleaning operation. If water conditions are severe enough to require periodic cleaning, Kolmetal will result in substantial savings by reducing downtime and maintaining full operating efficiency.

According to the manufacturer, two or three coats of Kolmetal—depending on the surface, and yielding a minimum thickness of 7 mils—are recommended. They are applied by brush or spray, with a 4-hr drying time between coats.

For maximum adhesion the surface must be completely clean before application, with no trace of oxidation, scale or other surface contamination. The resultant coating, when properly applied, can be polished, ground, drilled or bent to a 45 deg angle without chipping, peeling or cracking.

Kolmetal coated sections are now available from National Radiator Co., with the coating applied to the cast iron surface immediately upon removal from the mold. This eliminates the necessity for sandblasting which is required on surfaces which contain any trace of rust or foreign matter.



THE COATING IS ALSO used in same plant on structural members like this pipe-carrying bridge.

New Plating Process Deposits Nickel

By C. G. Rising
Supt. of Metal Div.
S. E. & M. Vernon Co.
Elizabeth, N. J.

◆ In its first production test, a new bright-nickel plating process has reduced costs, increased output and produced brighter deposits . . . Features built into process overcome shortcomings previously experienced and provide an easy-to-control bath . . . Operating ranges for temperature and current density are broad.

◆ Bath has good leveling properties, requiring no polishing or buffing before plating . . . Good ductility and low internal stress of deposit eliminates cracking, crazing, pitting and peeling . . . Heat and power costs are down, and thinner coatings possible . . . Stability of the bath is another important asset.

◆ BRIGHT-NICKEL PLATING by a new process has been put to its first large-scale commercial trial at the S. E. & M. Vernon Co., Elizabeth, N. J. After production of only a few months, plating costs have been reduced, output increased substantially, and coatings are brighter than ever before.

The new process, called Nickel-Lume, was developed recently by Hanson-Van Winkle-Munning Co., Matawan, N. J. Success of the process can be attributed to the many desirable characteristics which have been "built" into the bath. For example, the bath can be operated anywhere in the range from room temperature to 140°F or more without loss of brightness in the deposit. With moderate to high current densities, a temperature of more than 120°F is not necessary.

The bath can also be operated over a wide range of current densities. Density may vary from 5 to 70 amp per sq ft, and because of this wide range, plating speed can be adjusted without difficulty to the production schedule. This wide current density range also helps in obtaining uniformly bright deposits.

Other desirable features of the bath include its high tolerance to impurities and the use of stable brightening agents. Deposits are bright, approaching the whiteness of cobalt-nickel deposits. It also produces well-leveled surfaces, reducing roughness up to 50 pct or more and minimizing or eliminating polishing and buffing operations.

Surfaces plated by this process have had good corrosion resistance. Deposits have good ductility and low internal stress. They have shown no signs of cracking, crazing, pitting, lifting or peeling. With this process, non-premium anodes are completely satisfactory and standard plating equipment can be used.

In manufacturing loose-leaf binders and folders of many shapes, sizes and types, the Vernon Co. now plates 20 pct faster than previously, and is getting bright finishes in hard-to-plate recesses—something it didn't have and didn't expect to get. Plating is now done with 50 pct less amperage and 25 pct less nickel. Also, bath temperature is 40°F lower than before.

The ability of the new bath to operate at lower temperatures has reduced heat demands by as much as 25 pct. Power costs, too, have been cut sharply because the new process operates at 2000 amp compared to 4000 amp previously used. This saving is attributed to the thinner coatings, which are as good or better in appearance than previous coatings and require less amperage to produce.

Another important advantage is the ability of the bath to remain stable over long periods of time. During the entire period of operation, there has been no evidence of brightener breakdown. No costly batch purification has been necessary. At no time has there been a shutdown and the solution has not been removed from the tank for any reason.

Brighter, Faster

Thousands of binders and folders are plated daily on a 30-ft H-VW-M elevator-type fully-automatic plating machine. It is the same equipment which has been in use for the past several years and no additional equipment was required by adopting the process. No mechanical changes were necessary and only the tanks required scrubbing to prepare them for the new solution. Since the Nickel-Lume solution requires no ventilation, blowers and ducts were shut off.

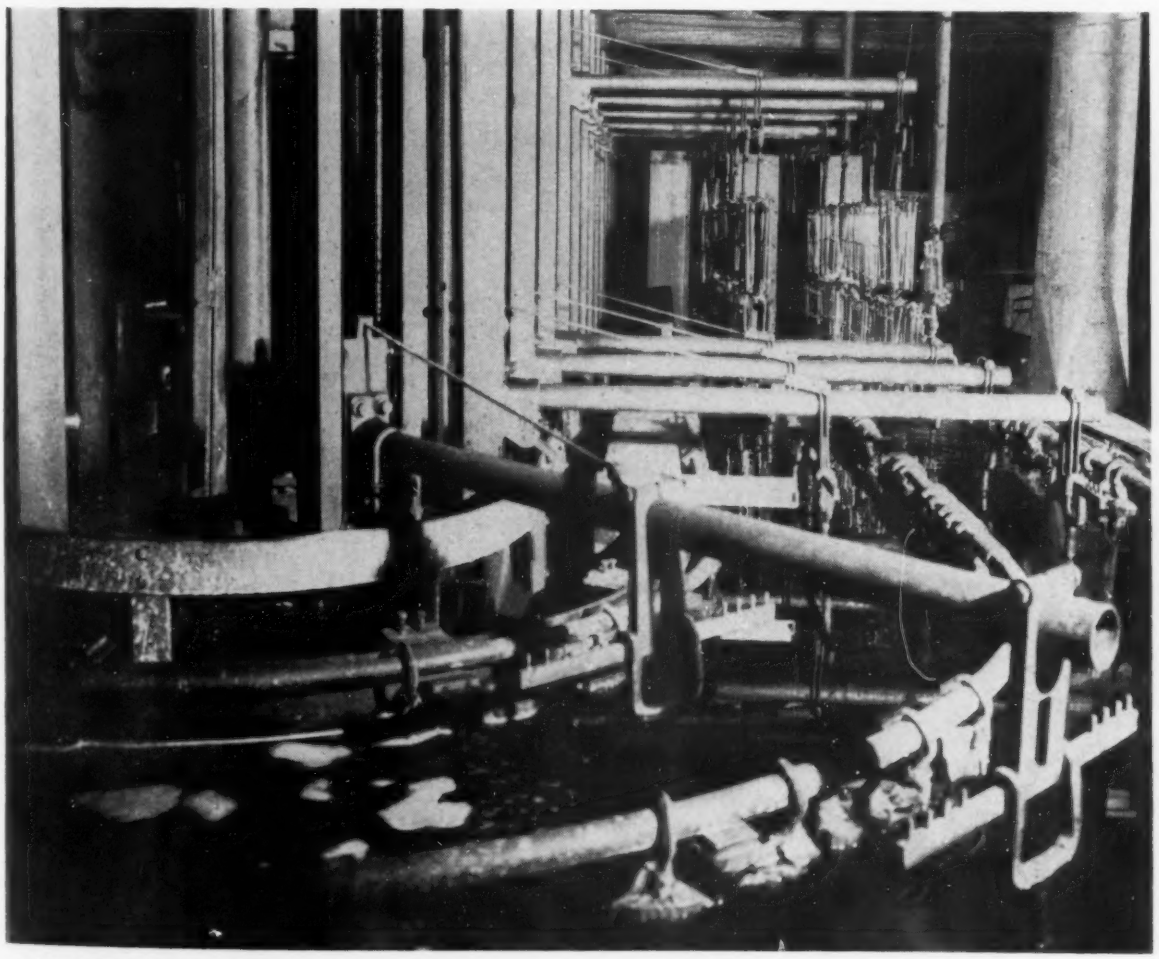
The process has required very little attention and is very simple to work with. Analyses of the bath are made weekly, and pH adjustments twice daily. Complete analytical control by chemical analysis is possible of all constituents in this bath, including the additional agents.

The first pieces turned out by this installation were satisfactory and have continued to be. There have been few rejects, and those have been caused by racking mishaps. When rejects do occur, they are not stripped but are simply sent back and double plated. This indicates the high activity of the plated surface.

In making up the Nickel-Lume solution, the following composition has given the best results:

Formula	Makeup, oz per gal
Nickel sulfate	40
Nickel chloride	6
Boric acid	5
NL-1 addition agent	1
NL-2 addition agent	0.26 (fl oz)
Anti-Pit No. 2	0.13 (fl oz)

A storage tank was filled about two thirds with water and heated to 150°F. The nickel sulfate was then added and dissolved. This was



THOUSANDS OF BINDERS for notebooks are plated daily to a bright-nickel finish in this 3200-gal rubber-lined tank. Good leveling properties of the bath eliminate buffing before plating.

"Deposits have good corrosion resistance, ductility and low internal stress . . ."

followed by adding and dissolving nickel chloride and boric acid in that order. To raise the pH of the solution to 5.2 to 5.5, a thin slurry of nickel carbonate was made in hot water and added directly to the bath. Hydrogen peroxide and activated carbon were also added to the bath, which was stirred intermittently for a few hours, then allowed to settle overnight.

The following day, the solution was filtered into the plating tank and the pH adjusted to 3.5 to 4.5 electrometric with sulfuric acid. Using corrugated dummy cathodes and 5 amp per sq ft, the bath was electrolyzed. This electrolysis continued for about 12 hr. In adding the addition agents, the NL-1 was dissolved in hot water and introduced to the bath through a filter, and the NL-2 and Anti-Pit No. 2 were added directly.

The nickel sulfate furnishes the nickel ions to the solution. Metallic nickel concentration, as derived from the nickel sulfate and nickel chloride, is about 8 to 10 oz per gal of solution. The nickel chloride promotes good anode corrosion while the boric acid exerts a buffering action in the cathode film.

Two types of brighteners are used in the 3200-gal Nickel-Lume bath. One, the NL-1 addition agent, is put into the solution when it is first made up. Originally, 200 lb of NL-1 were used, and since then, only one small addition has been made. It improves ductility in the deposit and transforms the tensile stress characteristic of a deposit from a Watts solution to one of low compressive stress.

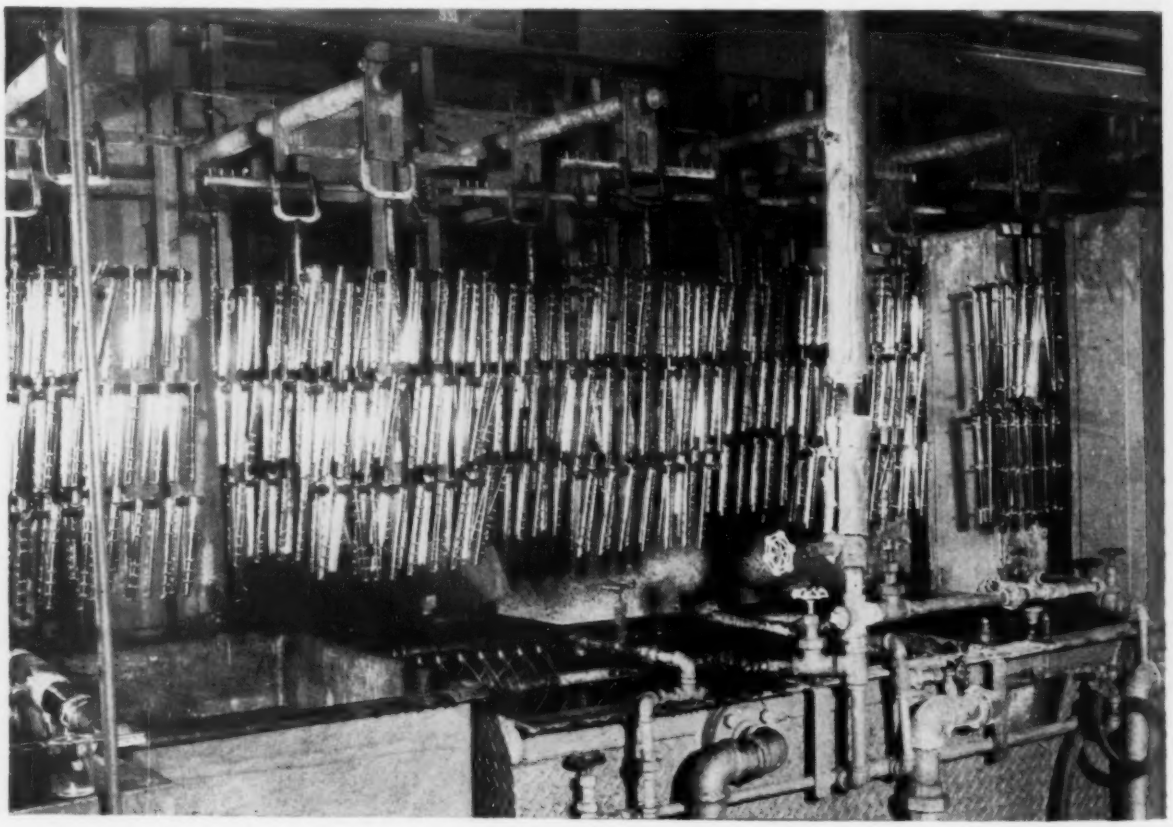
The other brightener, the NL-2 addition agent, is the primary brightener responsible for the brilliance and leveling action of the deposits. It is a liquid, and after the original addition of 3¼ gal, daily additions are made at the rate of 1 qt per 4000 amp-hr. The cost of all addition agents is $3.94 per day.

Solution continually purified

The best bath temperature for this job is about 120°F. The bath operates at 1 to 1½ v. Current densities of 10 to 100 amp per sq ft can be used but the optimum for binders and folders is 40 amp per sq ft. At this current density, plate thicknesses of 0.00015 to 0.0002 in. are obtained in 10 min. Cathode efficiency is 96 to 98 pct.

No agitation is used with this particular bath except for the slow motion of the work in passing through the tank on the conveyor.

The solution is continually being purified by selective electrolysis. Inorganic impurities are



KNIFING STREAMS of water in one tank, followed by rinsing in two air-agitated tanks, provide thorough cleaning of plating solution from binders. Hot-air drying finishes the operation.

removed in a rubber-lined tank at the end of the 800-sq ft installation. Corrugated anodes remove the principal impurities such as iron, copper and zinc. Removal of solid particles is done by passing the solution through diatomaceous earths in an Industrial filter. Before filtering, the solution passes through a Duriron heat exchanger.

Binder and folders, made of a No. 3 finish cold-rolled steel, are racked on a specially-designed racking reel. The racks are then placed on the conveyor arms of the plating machine. There are 30 arms on the conveyor, each capable of carrying two racks. Arms are mounted on rollers set in vertical guide channels which are connected to upper and lower endless chains. Crank arms lift and lower the work-carrying arms. The chain drive and elevator lift are interlocked so forward motion is obtained only with the elevator in the raised position.

In the plating cycle, parts are cleaned, plated, washed and dried. Dirt and finger-prints are first loosened up by dipping the binders in high-grade kerosene. They are then passed through a fine, cold spray. This is followed by two electrolytic cleaning baths, a cold water spray and a cold water rinse in a 200-gal tank. The parts are then minutely etched in a 10-pct solution of hydrochloric acid in a rubber-lined tank to assure good adhesion of the nickel deposit. Two cold rinses follow the acid dip, the second to prevent any acid carryover which might throw the nickel bath out of adjustment.

Actual plating is done in a rubber-lined steel tank. There are 110 anodes in this tank, each held by an anode bag which is impregnated top and bottom with a synthetic vinyl resin. Use of the anode bags eliminates unnecessary contamination of the bath and reduces the load on the filters. A plating time of 10 min produces a good coating.

Thorough rinsing for spotless work

After plating, the parts move to the dragout tank. At the end of each work day, solution from this tank is used as makeup for losses in the plating tank. Parts are then spray rinsed with knifing streams of water for extra good cleaning, and rinsed twice in tanks with air agitation. Rinsing throughout the operation is very thorough but it does help to turn out spotless work.

After the final rinse, parts pass through a dryer equipped with adjustable nozzles. The parts receive a blast of cold air, then a blast of hot air. As the racks are taken from the conveyor arms, the parts fall onto a table where they are arranged and packaged. The empty rack is placed back on the racking wheel for reloading with raw parts. The entire operation is handled by four persons.

FOUR PERSONS, and an elevator-type automatic plating machine, handle all of the production in the plating plant. Operators load and unload plating racks and package the binders.

How to Increase

By Claude Morgan
Consultant
Cone Automatic Machine Co., Inc.
Windsor, Vt.

◆ Close attention to machine design, tool design and tool lubrication will pay off in much faster screw machine output, better tool life, lower costs . . . Cone Automatic Machine Co. proved this in a series of studies using carbide tools at high speeds.

◆ High speed problems of chatter, poor finish, heat and tool wear can be licked . . . Recommendations require taking slack out of machines, modifying cutting tool designs, and use of a water soluble coolant.

◆ MANY ATTEMPTS have been made to increase parts production and cut costs on automatic screw machines by using carbide tools at higher speeds. Sometimes these efforts have resulted in chipped and cracked tools so that machining costs were higher rather than lower, and production rates dropped due to excessive machine downtime.

Cone Automatic Machine Co., Windsor, Vermont, recently set up a broad experimental program to study the requirements for high speed automatic screw machine production. Recognizing that greatly increased speeds and heavy feeds are directly related to problems of machine design, tool design and proper tool lubrication, the company undertook to evaluate and coordinate the individual and combined effects of these basic factors.

Technicians experimented with a wide variety of parts suited to screw machine production. Results were highly satisfactory in that sharp increases in output were accomplished without sacrificing product quality or decreasing tool life.

Through careful attention to the factors of machine design, tool construction, coolants and lubricants, principles were established to achieve high speed production.

Although the new automatic machines used in this project were built in accordance with the following design principles, older screw machines can be repaired and renovated to comply with these requirements:

Spindles—Rigidity must be assured and run-out controlled through the installation of new bearings if necessary. Very little play need be allowed for heat expansion if a proper tool lubricant is used to keep the heat factor at a minimum.

Collets—Must be capable of fast, positive

action either in gripping stock or releasing it.

Seals—Adequate seals must be provided at all critical points to minimize lubricating oil and coolant leakage.

Tool Slides—(front and cross) Play must be removed from all slides. Cam engagement must be positive so that there is no hesitation in transmission of motion.

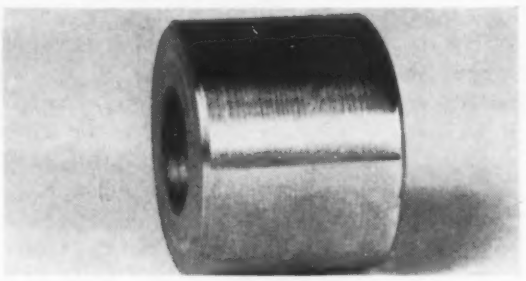
Power—There must be no slack in gearing. If v-belts are involved, they should be checked and replaced if necessary. A larger motor may be necessary because of greater horsepower requirements at higher speeds.

Pumps—Old, worn pumps may require replacement of shafts and seals to prevent leakage and maintain pressure. Under higher speed conditions, it may be necessary to install pumps of larger capacity to insure a good volume of flow to the tool area.

No blanket prescription can be made regarding the design of carbide tools for the great variety of jobs to be processed on automatic

Automatic Screw Machine Output

Machine: 1-5/8 in.—6 Spindle Conomatic
Material: 1-1/4 in. rd., 52100 steel
Spindle Speed: 1033 rpm
High Speed Drilling Attachment: 948 rpm
Total effective drilling speed: 1981 rpm
Turning: 360 sfpm
Drilling: 390 sfpm
Production Cycle: 9 sec per piece



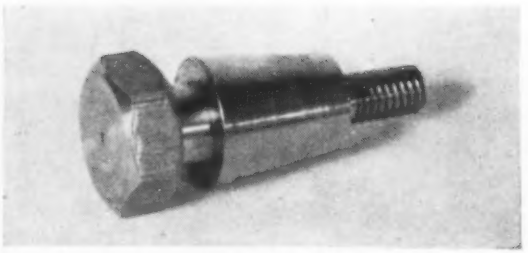
Machine: 1-5/8 in.—6 Spindle Conomatic
Material: 1 in. hex, 1112 steel cold drawn
Spindle Speed: 1562 rpm
Operations:

1. Break down corner, Feed 0.0025 in. Rough turn for taper. Feed 0.006 in. Finish turn for thread diam. Feed .006 in.
2. Rough form taper. Feed .0025 in. Center drill. Feed 0.006 in.
3. Neck. Feed 0.0025 in. Chamfer, thread end. Feed 0.006 in.
4. Finish shave of taper. Feed 0.0025 in.
5. Rough form for thread end and cut-off. Feed 0.0017 in. Thread, 3/8 in.—16 x 3/4 in., Jones & Lamson tangent die head.
6. Cut-off, 1/4 in. wide. Feed 0.0025 in.

Max. Cutting Speed: 450 sfpm
Production Cycle: 8 sec per piece

Each operation or position was checked as to horsepower required. Whereas operation 1 used 9 hp, operation 2 and 6 required only 1 hp each. All others used 3 hp. A total of 35 hp was required for the complete machine operation and all tooling positions.

It was found on this job that the economical point for tool regrind was at an average of 2000 pieces.



Machine: 1-5/8 in.—6 Spindle Conomatic
Material: 1 in. hex, 4620 cold drawn
Spindle Speed: 1033 rpm
Die Spindle: 1048 rpm (J & L tangent die head)
Total effective threading speed: 2081 rpm
Turning: 306 sfpm at 0.0077 in. feed
Threading: 455 sfpm
Production Cycle: 11 sec per piece

High speeds require some changes in tool designs and cutting angles . . . call for water soluble tool lubricants for better cooling . . .

screw machines. There are however, certain basic principles which can be applied to all new tool designs for effective high speed cutting:

Strength—Greater horsepower requirements at higher speeds require tool blanks of large enough section to support the heavy work load without breakage.

Angles—Rake and clearance angles will be different with the use of water soluble cutting fluids recommended for high speed use. On cut-off tools, a side clearance of five degrees has been normal practice with straight oil compounds. However, with high speed use of the water solubles, a two degree side clearance angle has proved to be better. This is because the water soluble lubricant keeps the operation cool and eliminates heat expansion. The water soluble fluid does not fill the five degree angle and give the cushioning effect of the straight oil compound.

Drills—Drill designs used at slower speeds with oil compounds are inadequate for high speed operations. A complete study of drill design is necessary for maximum efficiency.

Threading—The most efficient designs are quite different from those which are satisfactory at slower speeds. Rake angles are somewhat less since higher speeds and more efficient cooling help combat the chip welding problem.

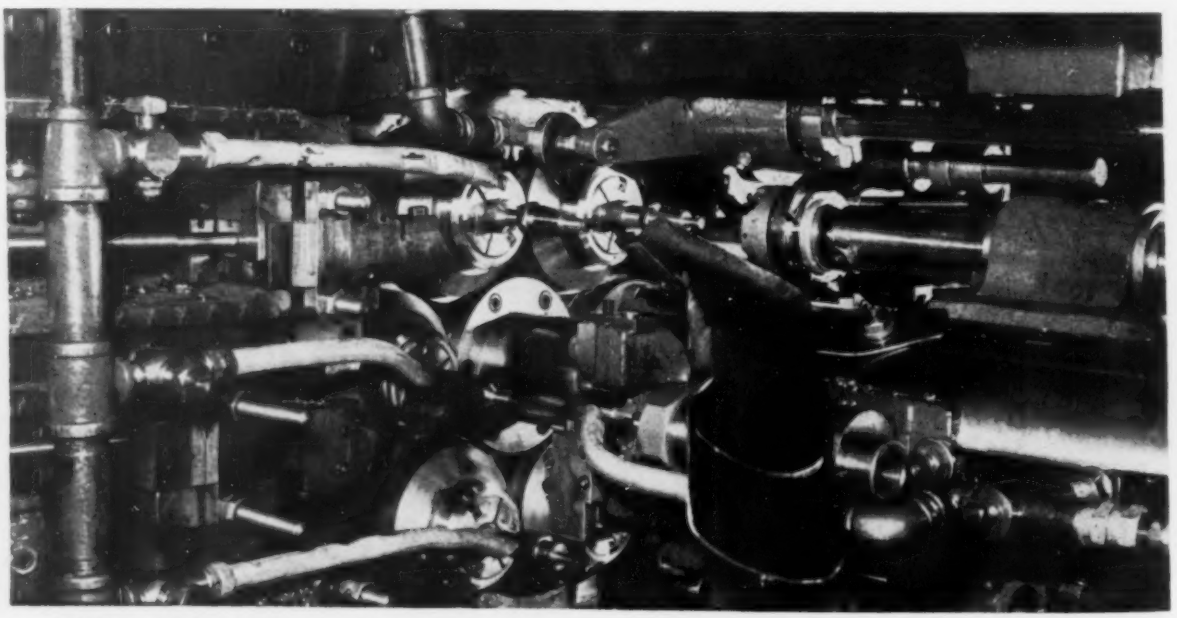
The most important function of the tool lubricant in high speed operation is to maintain as low and uniform a temperature as possible. As speeds increase, tool temperatures rise rapidly, and a lubricant with good cooling and penetrating qualities is essential. Without these cooling properties, chipping of carbide tools becomes a serious factor, and surface finish of the parts in process is affected. Lower, more uniform operating temperatures at high speeds also contribute materially to better size control.

As cutting speeds increase, the force of the chip movement over the tool decreases chip welding. Because of this, it is unnecessary to use the anti-weld type of cutting oil lubricant.

Although cooling and penetration are important from the standpoint of tool wear, good lubrication and maintenance of tool slides and exposed machine parts is also mandatory for holding close tolerances. The coolant-lubricant, as it dries, should leave a soft oil film that permits free functioning of the machine.

High speed, high temperature, close tolerance problems led to a study of water soluble tool lubricants. Many previous attempts to use water soluble coolants had failed because of lack of machine rigidity at high velocities. However, the Conomatics used in this program provided the necessary rigidity to permit the use of water solubles in conjunction with carbide tools. The water soluble oil used throughout the experimental project was Van Straaten Chemical Co.'s 5491-A. With this compound, the work ran consistently cool, size control was easily maintained, and work finishes and tool life were excellent.

The photographs and data on these pages show some of the successful experimental jobs run as a result of the company's investigation of high speed techniques.



FRONT VIEW of 1⅝ in.—6 Spindle Conomatic used in high speed studies. Machine has necessary power, rigidity, close tolerances and tight seals for most efficient use.

Fire Prevention:

New material, methods developed for roofing.

♦ LESSONS of the Livonia fire have awakened industry to the need for improved fire retardent materials, improved construction methods, and new approaches to fire fighting. Many companies are working on solutions to problems now underscored by the Livonia fire. Recently developed to overcome fire hazards present in conventional roofing, is a new type of fire-retardent roof construction material.

Possibilities of the material, supplied by Lexsuco, Inc., Cleveland, and used in conjunction with a special method of roofing construction were demonstrated recently in two test fires at Cleveland.

In both tests, intensely hot, kerosene-fed flames subjected especially built test roofs to conditions comparable to a highly destructive plant fire.

The new-type roof is designed to (1) prevent drippage of inflammable asphalt or tar, (2) eliminate combustible materials between roof deck and insulation and (3) improve roof rigidity, thus minimizing buckling of the steel roof deck during a fire. Such buckling produces combustible voids which expose the roof surface itself to fire in the plant below.

Fire-retarding features are gained through use of insulation clips for fastening insulation mechanically, and through use of a special vapor seal as a vapor barrier. Normally, roof insulation is set in a mopping of hot asphalt and the vapor barrier (or liner sheet) consists of two plies of asphalt-saturated roofing felts mopped with asphalt. By removing these readily burnable materials, the two hazardous factors have been eliminated.

Roof construction incorporates (1) standard steel decking, (2) a vapor barrier or liner sheet, (3) conventional roof insulation fastened to the steel deck by (4) insulation clips. A standard built-up roof is then applied over this base. Advantages claimed are:

1. It eliminates hazardous factors present in conventional roofs yet costs no more to install.
2. No change in the use of such standard and economical roofing materials as steel decking and built-up roof surfaces is required.
3. Roof rigidity is improved.

ROOF STANDS FIRM as fire rages under specially built structure.

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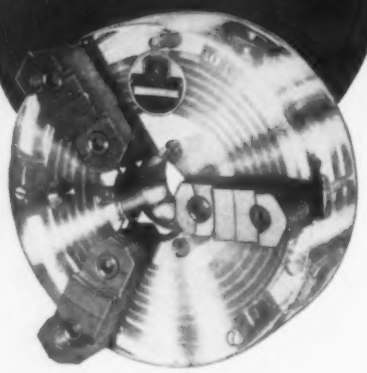

SEE the actual operation of a Horton Chuck with the new Plastic Demonstrators.

NOTICE the pilot hole construction of the independent chuck and the replaceable pinion bushings of the Scroll Universal Chuck — both Horton Exclusives.

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Windsor Locks, Conn.

Bellows:

Improved structure reduces flex failures.

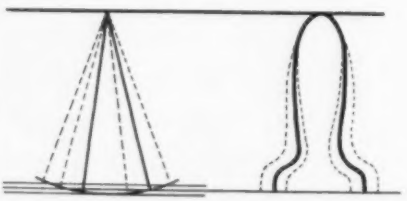
Failures in metal bellows due to flexing during expansion and contraction—occurring mainly at the bend in each convolution—have been substantially reduced with a welded diaphragm type bellows. Developed originally for atomic energy applications, the bellows is now being used in a variety of industrial applications.

Special construction of the bellows gives it long life under severe conditions of corrosion, vibration and high temperature, its designers claim. Applications as a shaft seal, expansion joint and vibration absorber in the aviation, ordnance and chemical fields are reported.

Why Bellows Fail

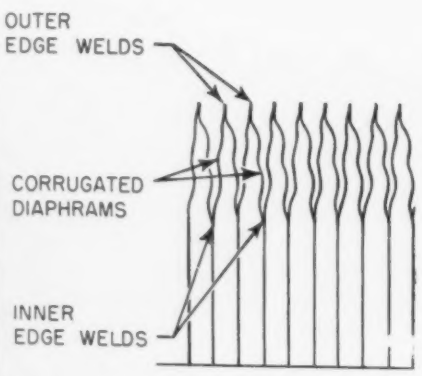
Analysis of failure of conventional metal bellows showed failure occurred mainly at the bend in each convolution, due to the concentration of flexing at this point during expansion and contraction of the bellows. This flexing concentration led to work hardening and consequent failure of the metal at this point.

The welded diaphragm construction distributes flexing over the entire height of the convolution avoiding the concentration of flexing and the resultant work hardening that leads to bellows failure, engineers of Titeflex, Inc., Newark, N. J., report.



Old and New:

Now the flex is spread . . .



Construction:

Welds, corrugations . . .

Advantages Outlined

They point out that this construction also affords the following advantages over the bellows of conventional construction:

1. Flexibility can be increased by increasing the height of bellows convolutions. This permits producing a bellows having the great flexibility required for lines conveying gases or liquids at low pressure. At the same time, this great flexibility can be attained with metal of sufficient thickness so that these bellows for low pressure lines can withstand the high external pressures such lines are often subjected to.

2. The increase of flexibility with height of convolution also permits much greater expansion range for every inch of bellows length than is possible with conventional bellows construction.

IF YOU WANT MORE DATA

You may secure additional information on any item briefed in this section by using the reply card on page 51. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Thus relatively long expansion ranges can be achieved in bellows of comparatively short initial length.

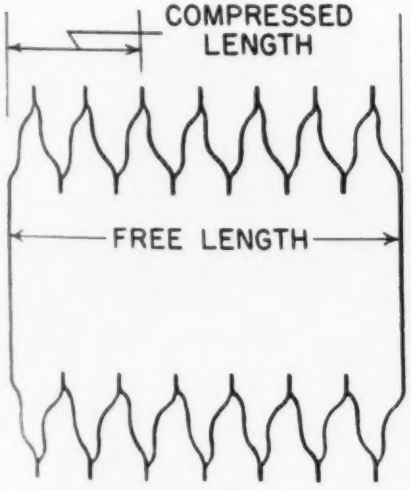
Two Types Developed

Two types of bellows using this new construction have been developed. A "standard" type consists of a series of male expansion elements, and a nesting type comprises a series of nesting male-and-female expansion elements for extreme flexibility applications.

The nesting type, made of a series of contoured internesting diaphragms welded on the inner and outer circumferential edges, results in an extremely flexible bellows especially suited for air and steam lines having low internal pressures.

The nesting construction permits extreme lineal movement. The nesting bellows can be compressed to solid metal height or expanded to five times compressed length. Also during these extreme variations in length, the internal and external diameters remain constant.

Both the standard and nesting type bellows are produced in a variety of metals (stainless steel, Monel and Inconel) to suit particular operating conditions.



In Nesting:

More squeeze, more stretch...

Turn Page

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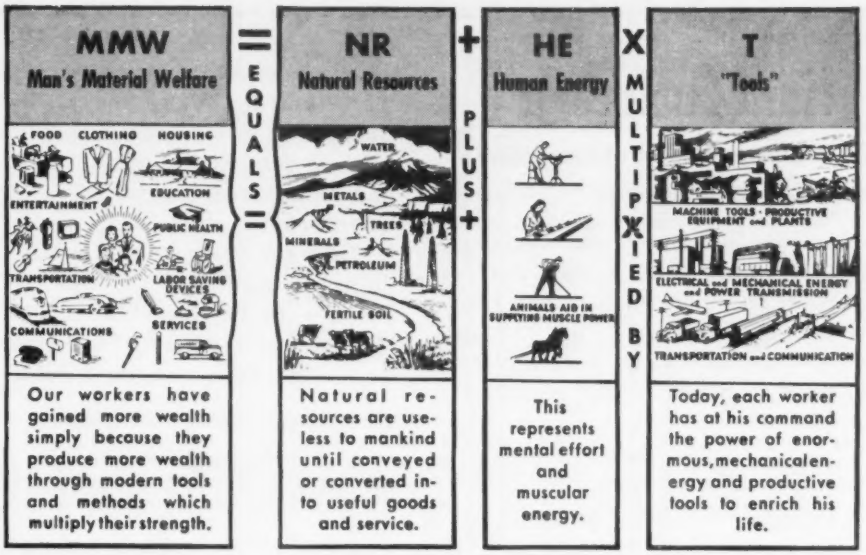


No Money in This Equation

The chart above depicts our economic body in its simplest terms. Note that money does not enter the equation.

As the chart shows, all goods and services come into being through the using up of (1) natural resources, (2) human energy and (3) tools. These are the *only* things involved and *money is not one of them.*

Money is one of the confusing elements to many people attempting to understand the economic body. Erase the money idea and one can see immediately that only as *production* of goods and services increase can *consumption* of goods and services increase. A million dollars is worthless if there is nothing to buy.

Production per manhour can be increased only with more and better "tools" of production. Higher wages without higher output create no additional goods or services. They simply put a higher money price tag on them.

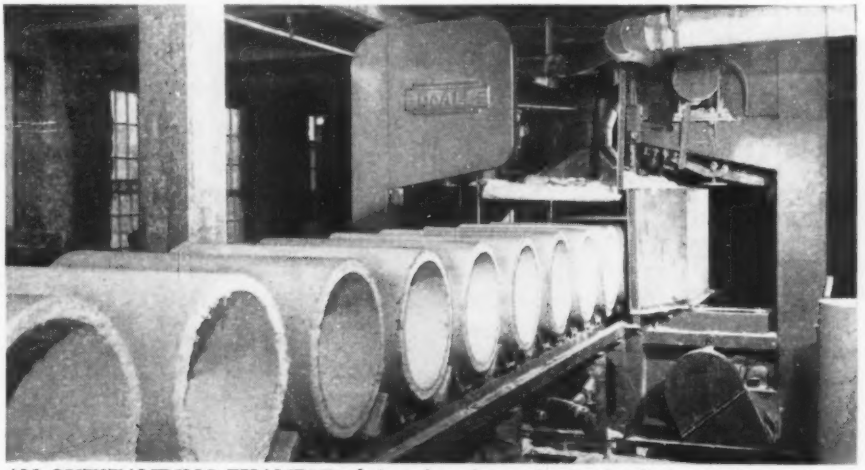
That which contributes to more productivity per manhour improves man's standard of living. Nothing else does.

Productivity of many plants has been increased in recent years by new tools. One of them is the contour sawing machine. It can do an amazing variety of jobs such as cutting shapes, slitting, slotting, cutting-off, trimming, filing, grinding, honing, sharpening, slicing and others. It utilizes 18 different types of cutting tools—narrow steel bands having teeth of various types. It saws out entire sections, cutting a narrow slot directly to a layout line. It will cut any material.

Upon request, DoALL will give at any plant, a free demonstration of these machines as well as of precision surface grinders, gage blocks, cutting tools and other specialties. Headquarters is The DoALL Company, Des Plaines, Illinois.

DoALL

FREE ON REQUEST for your bulletin boards: 17" x 22" wall chart "Why Living Improves in America".



AN OUTSTANDING EXAMPLE of American ingenuity in the design and use of tools to let men produce more with less effort. Here, two DoALL band saws are being used on each side of a conveyor to automatically trim the ends of magnesia insulating material.

Hard Surfacing:

Coated diesel engine valves outlast originals.

Diesel engine valves, reclaimed by coating the seating surface with an impact and wear resistant nickel base alloy, are outwearing new alloy steel valves in tests in 800-hp diesel freight engines.

The valves, coated by the Colmonoy sprayweld process, showed practically no wear after 355 days operation and were still serviceable.

The 355 day period is the equivalent of about 4000 hours of continuous operation. The valves have a 4-in. diam and are 13 in. long.

A No. 5 alloy, made by Wall Colmonoy Corp., Detroit, is applied to the worn valves by the three-step process at a cost of from ⅓ to ½ the price of a new valve.

The worn valve seating area is first threaded along the tapered surface or grit blasted to provide the necessary mechanical bond for the subsequent metal spraying operation.

Then the valve is chucked in a lathe or turning fixture and rotated while the powdered alloy is applied by a Spraywelder pistol supported in a tool post holder.

Pistol, Hose and Hopper

This pistol is connected through hoses to a wall or pedestal mounted panel unit that supports a powder hopper, carburetor, air regulator, air filter and connections to oxyacetylene tank and factory air supply lines.

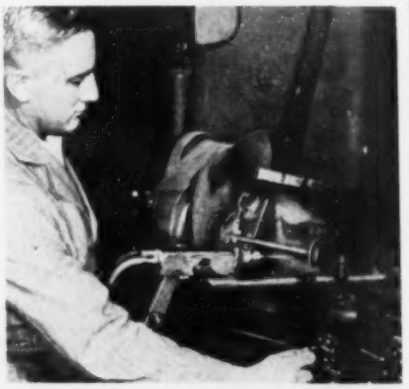
After the alloy has been sprayed on the valve seating surface to a thickness that will provide a finish ground thickness of 0.060 in., the pistol is swung out of the way.

In the final step, the valve is rotated under an oxyacetylene torch to fuse the nickel base alloy coating to the base metal, thus providing a fusion bonded, nonporous coating of wear and impact resistant alloy.

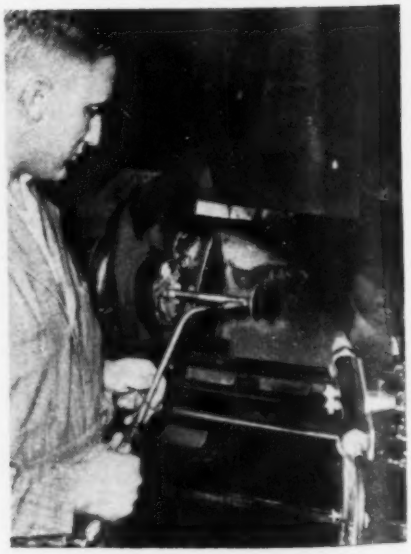
The seating area is finish ground on a conventional external grinding machine before installation in an engine.

The alloy has a nickel base and contains chromium and boron.

Reclaimed diesel valves . . .



First spray it on . . .



Then fuse with torch . . .

"No, that isn't the new Kinsey report, it's Pete's Columbia Tool Steel Catalog!"

COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILL.

Producers of fine tool steels — All types immediately available through Sales Offices, Warehouses and Representatives in Principal Cities.

TOOL COLUMBIA STEELS

Inspection:

Low cost industrial fluoroscope developed.

An industrial X-ray fluoroscope similar to that used by doctors for instantaneous visual X-ray examination for the human body, has recently been developed for use by industry.

Although improvements have been made in the quality of these fluoroscopic screens invented more than 50 years ago by Thomas A. Edison, and in the design of the X-ray tubes used, the methods used have been basically unchange for 50 years.

Radiate Gamma Rays

With the advent of atomic energy, intense sources of radioactive materials have become available at reasonable prices. These materials radiate gamma rays identical to X-rays. In theory, therefore, a very intense source of radioactive materials should be equivalent to a "hard" or penetrating X-ray tube.

Basis For Invention

This idea was the basis of the invention by Radioactive Products, Inc., of a gamma ray fluoroscope and is believed to constitute one of the more important developments in this field since its origin.

Of particular significance is the fact that gamma rays from materials such as radioactive cobalt are more penetrating than X-rays from all but the expensive multimillion volt machines. So penetrating are these radiations that only half of them will be absorbed in passing through ¾ in. of steel it is claimed.

See Industrial Uses

Ordinary X-ray fluoroscopes operate at much lower voltage and, consequently, do not have the penetrating power of gamma rays. While this is actually an advantage for medical examination of low density human tissue and bone, it has sometimes proved a limitation in the application of such devices to industrial inspections.

While the examination of food containers, shoes, thin metal castings and other light objects has been possible, the availability of low cost, high penetration radiation will greatly broaden the industrial possibilities of this technique.

This new instrument, which stands 7 ft high and contains its radioactive source in a steel-cased cylindrical lead shield 18 in. in diam, has aroused considerable interest among automobile manufacturers and foundry men. It may prove especially valuable to the aircraft industry where inspection of parts is a necessarily thorough and painstaking task.

WEBB PLATE FABRICATING MACHINERY

Steelworkers ALL STEEL CONSTRUCTION

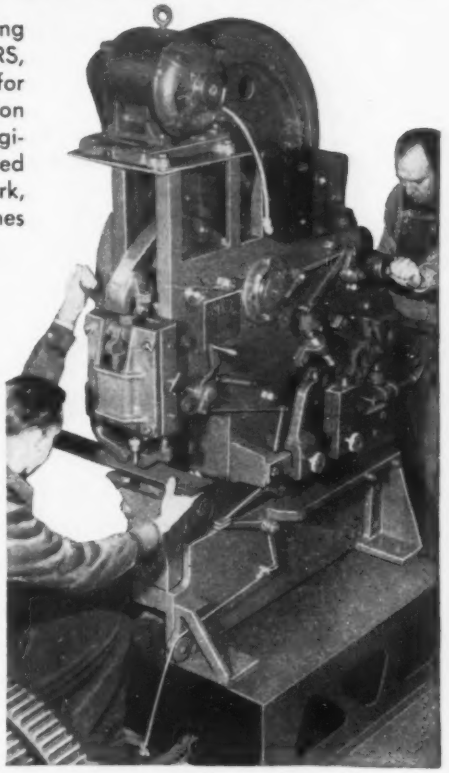
The Webb Corporation, in presenting the line of new WEBB STEELWORKERS, has designed versatile machines for either job-work or high production work. These units have been engineered to meet the particular need of shops having a variety of work, with a result that all-purpose machines are now available.

Five Complete Tools are Incorporated in a Single Unit.

1. Punch for plate, bars or structurals.
2. Cuts angles and tees with straight or miter cut.
3. Cuts off round and square bars.
4. Shears plates and bars.
5. Coping or notching attachment.

One of the main features of these machines is that they are at all times in complete readiness to do any of the above operations and to do the work well.

The punch may be operated at the same time as either the section cutter, bar cutter, shear or the coping and notching attachment . . . therefore, two operators can work at this machine simultaneously without interference. For illustrated literature and prices, write Dept. E.



Let Speed PAY–The WEBB Way!

SLIP ROLLS

PYRAMID TYPE ROLL

INITIAL TYPE ROLL

STEELWORKERS

Also Manufacturers of INDUSTRIAL WEIGHING EQUIPMENT

Since 1881 THE WEBB® CORP.

WEBB CITY, MO., U. S. A.

Saves time...money
All steel from one source

When you combine all your steel requirements on a single order to Ryerson you cut costs in many ways. One call—one order—save purchasing time and you also simplify bookkeeping—reduce clerical expense.

In addition, combining most carbon steel purchases under the Ryerson quantity differential plan brings further savings. And with larger quantities you often effect substantial reduction in freight on long hauls.

All these economies are possible when you call Ryerson for steel because Ryerson stocks are the world's largest and most diversified. Carbon steel, alloys, stainless—no matter what analyses you need, no matter what shapes and sizes, you can be practically certain of getting them all with just one call to Ryerson.

You can be sure of prompt delivery, too. So next time you need steel, no matter how many kinds or sizes, call your nearest Ryerson plant.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled & cold finished
STRUCTURALS—Channels, angles, beams, etc.
PLATES—Many types including Inland 4-Way Safety Plate
SHEETS—Hot & cold rolled, many types & coatings
TUBING—Seamless & welded, mechanical & boiler tubes
ALLOYS—Hot rolled, cold finished, heat treated
STAINLESS—Allegheny bars, plates, sheets, tubes, etc.
REINFORCING—Bars & Accessories, spirals, wire mesh
BABBITT—Five types, also Ryertex plastic bearings
MACHINERY & TOOLS—For metal fabrication

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT
PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age
FOUNDED 1855
Markets and Prices

THE IRON AGE SUMMARY...

- Set new record of 111.9 million tons output
- Year-end operations sag below 70 pct capacity
- Outlook for next year turns little brighter

By the end of next week American steel companies will have set a new record for steel produced in a year. It is estimated that 1953 output will total 111.9 million net tons. This is only one-tenth of a million tons less than THE IRON AGE predicted early this year the industry would pour during the 12-month period.

Production this year stands head and shoulders above the industry's best previous record of 105.2 million tons poured in 1951. Output in 1952 totaled only 93.2 million tons, as the operations of most companies suffered from a 54-day strike.

Operations this year, based on highest capacity in history (117.5 million net tons), averaged 95.2 pct of rated capacity. Highest average operating rate was achieved in 1951 when industry output averaged 100.9 pct of rated capacity.

Steelmakers are using the year-end holidays to balance out operations for 1953. Operations this week are scheduled at 67.0 pct of rated capacity, down 17.5 points from last week's revised rate. Indications are the rate will be about the same next week.

A good many furnaces will be banked over each of the holiday weekends; a few will go out of production before Christmas, and will not resume until after New Years.

While operating rates were sagging, the order outlook actually improved. Best news in several weeks was the Fisher Body request to its steel suppliers that its entire January and February delivery schedules be advanced a full 2 weeks. In most cases suppliers were more than glad to oblige.

This will boost January bookings from the auto industry significantly. Elsewhere in the Midwest there is a late move underway among some manufacturers to improve their January bookings. While this is tightening the market somewhat, they are having little trouble finding all the mill space they want.

Many important consumers are actually placing bigger first quarter 1954 orders than they did in 1953. The major mills tell the same story. Chief difference between now and last year appears to be: (1) A sizeable increase in capacity; and (2) a noticeable decline in military orders.

The market should remain at a good level through the first half of next year. After that, it's a good bet there will a slump—especially if a new wage contract is negotiated without a strike.

Rundown of product demand shapes up like this: Structurals and oil country goods are still tight, will ease gradually in early part of next year. Outlook for sheets and strip is brighter, especially coldrolled; this should hold through the first half. Carbon and alloy bars are not rallying as sheets and strip are. Nails and wire are very slow, partly because of seasonal factors.

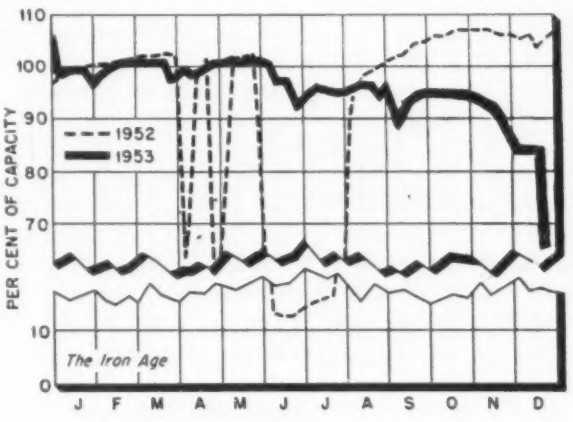
Scrap prices reflected lower steelmaking operations. THE IRON AGE Steel Scrap Composite Price fell 67¢ a ton to $30.00 per gross ton.

Steel Operating Rates

	Week of Dec. 20	Week of Dec. 13		Week of Dec. 20	Week of Dec. 13
Pittsburgh	75.0	91.0*	Detroit	35.0	81.0*
Chicago	74.0	93.5	Birmingham	80.5	96.5
Philadelphia	75.0	89.0*	Wheeling	45.0	88.0*
Valley	44.0	77.0	S. Ohio River	80.5	81.0
West	86.0	89.0*	St. Louis	64.0	88.0
Cleveland	50.0	78.0*	East	46.5	66.5
Buffalo	52.0	87.5	**AGGREGATE**	**67.0**	**84.5***

Beginning Jan. 1, 1953, operations are based on annual capacity of 117,547,470 net tons.

* Revised



Markets at a Glance

More Furnace Shutdowns . . . Republic Steel Corp. has closed down two more openhearths and another blast furnace at its Gadsden, Ala., plant because of a lack of orders. This latest cutback leaves only four of the Gadsden plant's eight openhearths and two of its four blast furnaces in operation. In addition, repairs on a 44-in. blooming mill at Republic's Cleveland plant forced suspension of openhearth, bar and blooming mill operations from Dec. 21. Repairs will not be completed until early in January. Blast furnace and coke plant may also be affected. Strip mill production will continue because the plant has a substantial inventory of semifinished slabs.

Workers Called Back . . . Around 1400 tin mill employees of U. S. Steel's Tennessee Coal & Iron Div. were called back to work last week after being laid off because of strikes at the Birmingham plants of Continental Can Co. and American Can Co. The workers were needed to fill orders of other tin mill customers, but it is expected that production will be cut back again if the can company strikes continue.

Freight Loading Dips . . . Loading of revenue freight for the week ended Dec. 12 totaled 651,951 cars, reports Assn. of American Railroads. This was 9.6 pct less than in the same week last year and a drop of 13.4 pct from same period in 1951.

New Galvanizing Line . . . Wheeling Steel Corp. has started up a new $3 million continuous galvanizing line at its Martins Ferry, Ohio, plant.

Cuts Zinc Production . . . Consolidated Mining & Smelting Co. of Canada, Ltd., will reduce zinc production 25 pct at the end of the year because of unfavorable market conditions. The company's zinc oxide plant and one slag furnace will be shut down.

Steel Pay at New High . . . Payroll of the iron and steel industry rose to a new high of $290,583,000 in October, reports American Iron & Steel Institute. Wages in September totaled $283,773,000 while in October, 1952, they amounted to $282,896,000.

GE Layoff Expected . . . General Electric Co. planned to lay off 3500 workers at its Syracuse Park division from Dec. 24 to Jan. 4. Cutback was blamed on high inventories of television sets and picture tubes.

Three Furnaces Out . . . Lack of business has forced U. S. Steel Corp. to bank or shut down three blast furnaces. Edgar Thomson No. 4 furnace was taken out of production Dec. 17, No. 7 was temporarily banked Dec. 18, and Youngstown works No. 4 was banked Dec. 16. Tinplate production at Pittsburgh and Gary was cut another day to 3 days per week due to the strike at American Can Co. plants.

U. S. Steel Expansion . . . Increased capacity for production of still tight wide-flange structural shapes at U. S. Steel's Gary plant is expected to result from government approval of certificates of necessity for $8 million. Award allows 65 pct on $1.43 million and 50 pct on $6.57 million. As yet no company authorization has been given. The certificates were granted for extension and modernization of rolling and finishing facilities as well as soaking pit improvements.

Foreign Competition Mounts . . . In pointing out the increased competition foreign manufacturers are giving U. S. electrical equipment producers, Yale University economist O. Glenn Saxon states that during the 1950-53 period foreign manufacturers were awarded one-third the dollar value of all bid purchases of heavy power equipment made by the government. During the first 10 months of this year, foreign firms were awarded $10,059,000 in electrical equipment contracts compared with $16,089,000 for American bidders.

Small Steel Users Buy More . . . An encouraging sign in the Detroit steel market is stronger demand from small steel consumers such as independent stamping plants. They are not buying at overtime consumption rates, but since their business picked up in the past month they have re-entered the steel market.

Prices At A Glance

(cents per lb unless otherwise noted)

Composite Prices	This Week	Last Week	Last Month	Last Year
Finished Steel, base	4.634	4.634	4.632	4.376
Pig Iron (gross ton)	$56.59	$56.59	$56.59	$55.26
Scrap, No. 1 hvy. (Gross ton)	$30.00	$30.67	$34.83	$42.00
Nonferrous Metals				
Aluminum, ingot	21.50	21.50	21.50	20.00
Copper, electrolytic	29.75	29.75	29.75	24.50
Lead, St. Louis	13.30	13.30	13.30	14.05
Magnesium, ingot	27.00	27.00	27.00	24.50
Nickel, electrolytic	63.08	63.08	63.08	59.58
Tin, Straits, N. Y.	84.75	86.00	86.25	$1.21½
Zinc, E. St. Louis	10.00	10.00	10.00	12.50

Comparison of Prices

(Effective Dec. 22, 1953)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Dec. 22 1953	Dec. 15 1953	Nov. 24 1953	Dec. 23 1952
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.925¢	3.925¢	3.925¢	3.775¢
Cold-rolled sheets	4.775	4.775	4.775	4.575
Galvanized sheets (10 ga.)	5.275	5.275	5.275	5.075
Hot-rolled strip	3.925	3.925	3.925	3.725
Cold-rolled strip	5.513	5.513	5.513	5.20
Plate	4.10	4.10	4.10	3.90
Plates wrought iron	9.30	9.30	9.30	9.00
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	36.75*
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$8.95	$8.95	$8.95	$8.95
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.65
Special coated mfg. ternes	7.75	7.75	7.75	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.16¢	4.16¢	4.15¢	3.95¢
Cold finished bars	5.20	5.20	5.20	4.925
Alloy bars	4.875	4.875	4.875	4.675
Structural shapes	4.10	4.10	4.10	3.85
Stainless bars (No. 302)	35.50	35.50	35.50	31.50
Wrought iron bars	10.40	10.40	10.40	10.05
Wire: (per pound)				
Bright wire	5.525¢	5.525¢	5.525¢	5.226¢
Rails: (per 100 lb.)				
Heavy rails	$4.325	$4.325	$4.325	$3.775
Light rails	5.20	5.20	5.20	4.25
Semifinished Steel: (per net ton)				
Rerolling billets	$62.00	$62.00	$62.00	$59.00
Slabs, rerolling	62.00	62.00	62.00	59.00
Forging billets	75.50	75.50	75.50	70.50
Alloy blooms, billets, slabs	82.00	82.00	82.00	76.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.525¢	4.525¢	4.525¢	4.325¢
Skelp	3.75	3.75	3.75	3.55
Finished Steel Composite: (per pound)				
Base price	4.634¢	4.634¢	4.632¢	4.376¢

* Add 4.7 pct.

	Dec. 22 1953	Dec. 15 1953	Nov. 24 1953	Dec. 23 1952
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$61.19	$61.19	$61.19	$60.69
Foundry, Valley	56.50	56.50	56.50	55.00
Foundry, Southern, Cin'ti	60.43	60.43	60.43	58.93
Foundry, Birmingham	52.88	52.88	52.88	51.38
Foundry, Chicago†	56.50	56.50	56.50	55.00
Basic del'd, Philadelphia	60.27	60.27	60.27	59.77
Basic, Valley furnace	56.00	56.00	56.00	54.50
Malleable, Chicago†	56.50	56.50	56.50	55.00
Malleable, Valley	56.50	56.50	56.50	55.00
Ferromanganese‡, cents per lb.	10.00¢	10.00¢	10.00¢	8.06¢

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.

‡ Average of U. S. Prices quoted on Ferroalloy pages, 76 pct Mn basis.

Pig Iron Composite: (per gross ton)				
Pig iron	$56.59	$56.59	$56.59	$55.26
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$31.50*	$32.50	$36.50	$43.00*
No. 1 steel, Phila. area	29.00	29.00	34.50	41.50*
No. 1 steel, Chicago	*29.50*	30.50	33.50	41.50*
No. 1 bundles, Detroit	*23.50*	25.50	28.50	41.15*
Low phos., Youngstown	*33.50*	34.00	37.50	46.50*
No. 1 mach'y cast, Pittsburgh	44.50	44.50	45.50	52.00
No. 1 mach'y cast, Philadel'a	40.50	40.50	42.00	52.00
No. 1 mach'y cast, Chicago	36.50	36.50	38.00	46.50

* Basing pt., less broker's fee. † Shipping pt., less broker's fee.

Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$30.00*	$30.67	$34.83	$42.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.38	$14.38	$14.38	$14.75
Foundry coke, prompt	17.25	17.25	17.25	17.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	29.75‡	29.75‡	29.75‡	24.50
Copper, Lake, Conn.	*30.00*	30.125	30.125	24.625
Tin, Straits, New York	8*5.75*†	86.00*	86.25	$1.21½
Zinc, East St. Louis	10.00	10.00	10.00	12.50
Lead, St. Louis	13.30	13.30	13.30	14.05
Aluminum, virgin ingot	21.50	21.50	21.50	20.00
Nickel, electrolytic	63.08	63.08	63.08	59.58
Magnesium, ingot	27.00	27.00	27.00	24.50
Antimony, Laredo, Tex.	28.50	28.50	34.50	34.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	$8.00	58.50	59.00	59.50	.....
Birmingham *R3*	52.38	52.88	.....	.....	.....
Birmingham *W9*	52.38	52.88	.....	.....	.....
Birmingham *S5*	52.38	52.88	.....	.....	.....
Buffalo *R3*	56.00	56.50	57.00	.....	.....
Buffalo *H1*	56.00	56.50	57.00	.....	.....
Buffalo *W6*	56.00	56.50	57.00	.....	.....
Chicago *I4*	56.00	56.50	56.50	57.00	.....
Cleveland *A5*	56.00	56.50	56.50	57.00	61.00
Cleveland *R3*	56.00	56.50	56.50	.....	.....
Daingerfield *L3*	52.50	52.50	52.50	.....	.....
Duluth *I4*	56.00	56.50	56.50	57.00	.....
Erie *I4*	56.00	56.50	56.50	57.00	.....
Everett *M6*	.....	63.00	63.50	.....	.....
Fontana *K1*	62.00	62.50	.....	.....	.....
Geneva, Utah *C7*	56.00	56.50	.....	.....	.....
Granite City *G2*	57.90	58.40	58.90	.....	.....
Hubbard *Y1*	.....	.....	56.50	.....	.....
Minnequa *C6*	58.00	59.00	59.00	.....	.....
Monessen *P6*	56.00	.....	.....	.....	.....
Neville Isl. *P4*	56.00	56.50	56.50	.....	.....
Pittsburgh *U1*	56.00	.....	.....	57.00	.....
Sharpsville *S3*	56.00	56.50	56.50	57.00	.....
Steel on *B3*	58.00	58.50	59.00	59.50	64.00
Swedeland *A2*	58.00	58.50	59.00	59.50	.....
Toledo *I4*	56.00	56.50	56.50	57.00	.....
Troy, N. Y. *R3*	58.00	58.50	59.00	59.50	64.00
Youngstown *Y1*	.....	.....	56.50	57 00	.....
N. Tonawanda *T1*	.....	56.50	57.00	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for .05 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 and over.

Silvery Iron: Buffalo, *H1*, $68.25; Jackson, *J1*, *G1*, $67.00. Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct or more phosphorus. Manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb., f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00	.....	14.25
Slabs, billets, rerolling	20.50–20.75	22.75	24.75	23.75	36.25	29.50	32.25	18.25	.....	18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50–46.75	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	58.75–59.00	45.75–46.00	51.25	30.00	30.50–31.00	30.50
Sheets	46.25	46.50	48.75	48.75	64.50	55.50	60.75	40.75	41.25	43.50
Strip, hot-rolled	29.75	32.00	36.75	34.25	55.00	42.00	46.50	26.25	.....	27.00
Strip, cold-rolled	38.25	41.50	45.50	43.75	66.50	54.50	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Lockport, N. Y., *R4.*

Strip: Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Middletown, O., *A7;* Harrison, N. J., *D3;* Youngstown, *C5;* Lockport, N. Y., *S4;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *W1* (.25¢ per lb. higher); New Bedford, Mass., *R6.*

Bars: Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Lockport, N. Y., *S4;* Canton, O., *T5;* Ft. Wayne, *I4.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11.*

Plates: Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Lockport, N. Y., *S4;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15.*

Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa., *J2.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11.*

Kennecott Buys Kaiser Aluminum Stock

Big copper producer spreads investment to aluminum . . . Completes Kaiser's equity financing for $230 million expansion . . . Aluminum secondary ingot slips—By *R. L. Hatschek.*

Big deal of the week in nonferrous metals was the announcement by Kennecott Copper Corp. that it will purchase $16.25 million worth of convertible preferred stock in Kaiser Aluminum & Chemical Corp. and 100,000 shares of common stock. With this deal, Kennecott is spreading out into a metal which has become more and more competitive with copper.

Anaconda Copper Mining Co., another of the big copper companies, has diversified in a different way—by setting up Anaconda Aluminum Co. and building a reduction plant in Montana. Both copper firms, of course, are insuring their future.

Finishes Financing . . . Kaiser spokesmen indicated that the deal with Kennecott will complete the program of equity financing used to pay for the expansion and construction program started in 1951. Cost of the program totaled $230 million.

Kennecott will own 325,000 of Kaiser Aluminum's 700,000 outstanding preferred shares. They'll carry a 5½ pct dividend and are convertible to common at $30 per share for the next 20 years.

Good Year . . . Copper and copper-base mill and foundry products shipments are estimated by Business and Defense Services Administration to total 2.55 million tons for the year 1953. This tops 1952 by almost 100,000 tons and is attributed by the agency to resumed civilian use of the red metal which more than took up the slack of reduced military consumption.

Estimated shipments break down as follows: Brass mill products, 1.329 million tons; copper wire mill products, 720,500 tons; powder mill and foundry products, 507,000 tons. Respective increases over the previous year for these categories are approximately 4 pct, 5 pct and almost 1 pct.

Copper Output Dips . . . November statistics of the Copper Institute show declining refined production both in the U. S. and outside. Tally for domestic output was 119,230 tons, off about 7000 tons, and foreign production hit 79,009 tons, down some 13,600 tons. Total deliveries remained steady at 180,917 tons while domestic was off almost 10,000 tons and foreign was up by a like amount.

Net result was that refined stocks in the U. S. increased 8971 tons and foreign held stocks went up 2415 tons. Refined stocks held in the country at the beginning of this month totaled 93,274 tons and held outside the U. S. have now mounted to 261,096 tons.

Chilean Copper Sold . . . Reports are that more Chilean metal has been sold at 30.00¢ per lb delivered Connecticut Valley and refiners are still selling at 29.50¢. So the price picture hasn't changed—as yet.

It is noteworthy, however, that custom smelters have trimmed ½¢ to 1¢ per lb from their scrap buying prices. New levels place No. 1 heavy copper and wrie at 24¢ to 24½¢ per lb, No. 2 heavy copper and wire at 22½¢, and light copper at an even 21¢. Ingot makers have likewise shaded their buying prices on No. 2 and light copper.

Aluminum Ingot Off . . . Producers of secondary aluminum ingot, also easing off on their scrap buying prices for the second week in a row, have again trimmed prices on their products. Bottoms of last week's quotations still hold; top-of-the-range figures were clipped ¼¢ to ½¢ per lb. Dealers' buying prices for aluminum scrap don't yet reflect the trend.

Zinc Stocks Rise . . . For the sixth consecutive month, smelter stocks of slab zinc registered an increase. At the beginning of December the total stood at 165,563 tons, about 7000 tons higher than the previous month. Production total for November showed the first effect of cutbacks in smelter output — which are continuing. Output for the month was down more than 8000 tons to 75,830 tons.

Shipments for the month were about 1500 tons higher at 68,684 tons and unfilled orders were some 7000 tons higher at 29,437 tons but it will take some time before supply and demand become nearly enough matched to permit a hike in prices.

Only noteworthy item in the zinc market is the good demand for Special High Grade which seems to be on the increase.

NONFERROUS METAL PRICES

(Cents per lb except as noted)

	Dec. 16	Dec. 17	Dec. 18	Dec. 19	Dec. 21	Dec. 22
Copper, electro, Conn.	29.50–30.00	29.50–30.00	29.50–30.00	29.50–30.00	29.50–30.00	29.50–30.00
Copper, Lake delivered	30.00	30.00	30.00	30.00	30.00	30.00
Tin, Straits, New York	86.00	86.25	85.25	....	84.75	84.75*
Zinc, East St. Louis	10.00	10.00	10.00	10.00	10.00	10.00
Lead, St. Louis	13.30	13.30	13.30	13.30	13.30	13.30

Note: Quotations are going prices
*Tentative

Nonferrous Prices

(Effective Dec. 22, 1953)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.136 in. and thicker, 2S, 3S, 33.9¢; 4S, 36.0¢; 52S, 38.2¢; 24S-O, 24S-OAL, 37.0¢; 75S-O, 75S-OAL, 44.7¢; 0.081-in., 2S, 3S, 35.1¢; 4S, 37.7¢; 52S, 39.9¢; 24S-O, 24S-OAL, 38.4¢; 75S-O, 75S-OAL, 46.9¢. 0.032-in., 2S, 3S, 37.0¢; 4S, 41.8¢; 24S-O, 24S-OAL, 46.9¢; 75S-O, 75S-OAL, 58.4¢.

Plate, ¼-in. and Heavier: 2S-F, 3S-F, 32.4¢; 4S-F, 34.5¢; 52S-F, 36.2¢; 61S-O, 35.6¢; 24S-O, 24S-OAL, 36.9¢; 75S-O, 75S-OAL, 44.3¢.

Extruded Solid Shapes: Shape factors 1 to 5, 37.4¢ to 82.8¢; 12 to 14, 38.2¢ to 99.0¢; 24 to 26, 40.9¢ to $1.29; 36 to 38, 48.4¢ to $1.89.

Rod, Rolled: 1.064 to 4.5-in., 2S-F, 3S-F, 43.8¢ to 37.2¢; cold-finished, 0.375 to 3.499-in., 2S-F, 3S-F, 47.6¢ to 39.3¢.

Screw Machine Stock: Rounds, 11S-T3, ½ to 11/32-in., 59.6¢ to 47.0¢; ⅜ to 1½-in., 46.6¢ to 43.8¢; 1 9/16 to 3-in., 42.7¢ to 39.9¢. Base 5000 lb.

Drawn Wire: Coiled 0.051 to 0.374-in., 2S, 44.1¢ to 32.4¢; 52S, 53.4¢ to 39.1¢; 17S-T4, 60.1¢ to 41.8¢; 61S-T4, 53.9¢ to 41.3¢.

Extruded Tubing: Rounds, 63S-T5, OD 1¼ to 2-in., 31.6¢ to 60.7¢; 2 to 4 in., 37.7¢ to 51.1¢; 4 to 6 in., 38.2¢ to 46.6¢; 6 to 9 in., 38.7¢ to 48.8¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42¾ x 60 in., $2.838; x 96 in., $4.543; x 120 in., $5.680; x 144 in., $6.816. Coiled sheet, per lb, 0.019 in. x 28 in.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and plate: FS1-O¼ in., 66¢; 3/16 in., 68¢; ½ in., 70¢; B & S Gage 10, 71¢; 12, 75¢. Specifications grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 77¢; ½ to ¾ in., 60.5¢; 1¼ to 1.749 in., 56¢; 2½ to 5 in., 51.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft, for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD, ¼ to 5/16 in., $1.43; 5/16 to ⅜ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall; OD, ⅝ to ¾ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(100,000 lb base, f.o.b. mill)

Commercially pure and alloy grades; Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	86½	67½	92½
Strip, CR	92½	70½	98½
Rod, bar	82½	65½	88½
Angles, HR	82½	65½	88½
Plate, HR	84½	66½	90½
Seamless Tube	115½	100½	137½
Shot, blocks	....	60	....

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	46.41	....	48.48
Copper, h-r	48.38	44.73	....
Copper, drawn	....	45.98	....
Low brass	44.47	44.41	....
Yellow brass	41.72	41.66	....
Red brass	45.44	45.38	....
Naval brass	45.76	46.07	41.33
Leaded brass	....	....	39.11
Com. bronze	46.95	46.89	....
Mang. bronze	49.48	43.62	45.18
Phos. bronze	66.58	67.08	....
Muntz metal	43.96	39.77	41.02
Silver, 10 pct	55.36	....	62.63

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	21.50
Aluminum pig	20.00
Antimony, American, Laredo, Tex.	28.50
Beryllium copper, per lb conta'd Be	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	29.50 to 30.00
Copper, Lake, delivered	30.125
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$165 to $175
Lead, St. Louis	13.30
Lead, New York	13.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	27.00
Magnesium, sticks, 100 to 500 lb.	45.00 to 47.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$186 to $189
Nickel electro, f.o.b. N. Y. warehouse	63.08
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	56.25
Palladium, dollars per troy oz.	$22 to $24
Platinum, dollars per troy oz.	$91 to $93
Silver, New York, cents per oz.	85.25
Tin, New York	84.75
Titanium, sponge	$5.00
Zinc, East St. Louis	10.00
Zinc, New York	10.50
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered carloads)

85-5-5-5 ingot	
No. 115	24.50
No. 120	23.75
No. 123	23.25
80-10-10 ingot	
No. 305	28.75
No. 315	26.50
88-10-2 ingot	
No. 210	37.50
No. 215	34.00
No. 245	29.50
Yellow ingot	
No. 405	20.75
Manganese bronze	
No. 421	25.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	23.00-23.75
0.60 copper, max.	22.75-23.25
Piston alloys (No. 122 type)	20.75-21.50
No. 12 alum. (No. 2 grade)	19.75-20.25
108 alloy	20.75-21.25
195 alloy	21.75-22.25
13 alloy (0.60 copper max.)	22.75-23.25
ASX-679	20.75-21.25

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—96-97½%	21.00-21.50
Grade 2—92-95%	20.00-20.50
Grade 3—90-92%	19.00-19.50
Grade 4—85-90%	17.25-18.00

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	44.54
Electrodeposited	38.38
Flat rolled	47.14
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	84.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	94⅛

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63.90
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	30.00
Nickel chloride, 375 lb drum	38.00
Silver cyanide, 100 oz. lots, per oz.	75½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	54.30

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25¼
Yellow brass	19¾	18
Red brass	23	22¼
Comm. bronze	23⅞	23⅛
Mang. bronze	18¼	17½
Yellow brass rod ends	19½	....

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	24 —24½
No. 2 copper wire	22½
Light copper	21
*Refinery brass	19½—20

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	25
No. 2 copper wire	23 —23½
Light copper	21½—22
No. 1 composition	18 —18½
No. 1 comp. turnings	17½—18
Rolled brass	14½—15½
Brass pipe	15 —16
Radiators	13½—14
Aluminum	
Mixed old cast	11 —11½
Mixed new clips	12¾—13½
Mixed turnings, dry	11¾—12
Pots and pans	11 —11½

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	23 —23½
No. 2 heavy copper and wire	21 —21½
Light copper	19 —19½
New type shell cuttings	19 —19½
Auto radiators (unsweated)	12½—13
No. 1 composition	17 —17½
No. 1 composition turnings	16 —17
Unlined red car boxes	14½—15
Cocks and faucets	14½—15
Mixed heavy yellow brass	11 —11½
Old rolled brass	14 —14½
Brass pipe	16 —16½
New soft brass clippings	17 —17½
Brass rod ends	14 —15
No. 1 brass rod turnings	12 —12½

Aluminum

Alum. pistons and struts	7 — 7½
Aluminum crankcases	10 —10½
2S aluminum clippings	13 —13½
Old sheet and utensils	10 —10½
Borings and turnings	6½— 7
Misc. cast aluminum	10 —10½
Dural clips (24S)	11 —11½

Zinc

New zinc clippings	5 — 5½
Old zinc	3½— 4
Zinc routings	2 — 2½
Old die cast scrap	2½— 3¼

Nickel and Monel

Pure nickel clippings	60 —70
Clean nickel turnings	40
Nickel anodes	60 —70
Nickel rod ends	60 —70
New Monel clippings	24 —26
Clean Monel turnings	19 —21
Old sheet Monel	22 —24
Nickel silver clippings, mixed	14
Nickel silver turnings, mixed	12

Lead

Soft, scrap, lead	10½
Battery plates (dry)	5½— 5¾
Batteries, acid free	3½

Magnesium

Segregated solids	20 —21
Castings	19 —20

Miscellaneous

Block tin	65 —67
No. 1 pewter	40 —45
No. 1 auto babbitt	37 —38
Mixed common babbitt	11 —12
Solder joints	14 —14½
Siphon tops	35
Small foundry type	15
Monotype	13½
Lino. and stereotype	12½
Electrotype	11
Hand picked type shells	7 — 8
Lino. and stereo. dross	4¾ — 5¼
Electro dross	3¼ — 3½

Prices Skid in Holiday Markets

Weakness permeates year-end market as Iron Age Composite slips to $30 . . . Trade keeps one eye on scrap stocks, the other on tumbling ingot rate.

Downward trend in scrap prices continued to the very end of the year with THE IRON AGE Steel Scrap Composite Price slipping off another 67¢ to another new low of $30.00 per gross ton. General weakness was felt in all steelmaking centers as the ingot rate plunged for the Christmas and New Year holidays.

While most scrap dealers seem pessimistic, there is some feeling that now is the time for them to stock up on cheap scrap. Mills will have to come back into the market and it could well be at higher prices than present levels.

On the other hand, mill stockpiles are fairly substantial and, in some areas, it's doubted that the ingot rate will bounce all the way back after the holidays. With this in mind, those stockpiles take on greater stature.

One ominous note is the declining demand for alloy steels, largely produced these days in electric furnaces from a virtual 100 pct scrap charge.

Pittsburgh — The market declined again this week in view of continued consumer disinterest and lower prices in adjoining areas. While there has been no significant buying, mills and brokers alike agreed that weak tone of the market must be recognized. Openhearth grades were off $1. Activity by consumers is not likely until after turn of the year. Brokers were bidding significantly low for covered industrial lists, and railroad scrap was weak. Low phos also was off.

Chicago—Only bright spot in Chicago scrap this week appeared to be the approaching Christmas parties. Prices were becoming nominal, dealer prices were sinking, and no spurt in consumer buying was foreseen before early January. Rail prices, which have been a bright spot for some time, finally began a significant drop and are now expected to move with the rest of the market. Some rather good purchase prices paid at least two roads in the area failed to halt the decline in consumer interest. Mill buying in early January is expected to be low, accounting for the pessimistic forecasts. Weather has been good, ore supplies are strong, and operating rates for several mills in the area are remaining low, arguing for little pickup in buying activity in the early first quarter.

Philadelphia—Drowsy it was—now the scrap market has gone to sleep for the holiday season. The one mill taking in scrap by truck has stopped shipment and the price range has narrowed. Small sales of electric furnace scrap have confirmed earlier quotations, but new business in turnings has trimmed blast furnace scrap prices. Dwindling ingot rate continues to swell appearance of stockpiled scrap.

New York—Scrap in this area continued in its year-end slump, although a small sale last week had pegged steelmaking grades $1 to $2 higher. But no permanent improvement was expected by the trade until after the first of the year. Cast continued steady, and some sources believed a little tightness might show up in the near future.

Detroit—Only token buying exists here and a sharp falling off of steelmaking operations in the area is adding further pessimism to the market. Most steelmaking grades dropped $1 to $2 and some blast furnace grades also continued a downward trend. Dealers are receiving little scrap and keeping their yards clean to avoid possibility of getting caught with heavy loads if the market continues to slump.

Cleveland—Openhearth grades softened another dollar in Cleveland and the Valley this week as one Valley consumer bought about 3500 tons of busheling for electric furnace at $32. Market is still weak and very nominal. Some brokers believe prices could go up as much as $5 after the first of the year if mills come in for as much as one quarter of their normal tonnage. Although good heavy melting scrap is appraised at $30 in some areas, market still hasn't weakened to the point where this figure is popular with all sellers.

Birmingham—Scrap in this district is practically at a standstill, with all steel mills out of the market until the first of the year. Mills have kept stockpiles built up for the last 4 or 5 months, buying only enough to replenish them. Foundries last month bought heavily of cast and other foundry grades and have built up stocks.

St. Louis—Railroad list closing during the week generally brought present market prices. There was little buying by the mills and it is now expected they will not come into the market until after the turn of the year. It is believed that buying then will not be heavy. Shipments have been good. Most prices are unchanged.

Cincinnati — Random length rails and 18-in. rail crops dropped $1 to $37 and $45 respectively. Drop broken cast also went down $1 to $45. All three changes were based on actual sales. Market otherwise was quiet. Dealer scrap is piling up, but so far there is no indication that small operators are crying for financial help. Limited January buying is expected.

Buffalo—Prices on steelmaking scrap slipped another $1 per ton as leading buyers remained out of the market. Mills had either completed orders or were refusing shipment.

Boston — With the Holidays approaching market was even quieter than it has been—which was pretty quiet. There was a trickle of activity in No. 1 heavy melting and No. 1 bundles in the Worcester area at prices up to $25.

West Coast—Steel scrap prices are expected to be unchanged during January. Little scrap is being produced or in demand anywhere on the Coast except Los Angeles.

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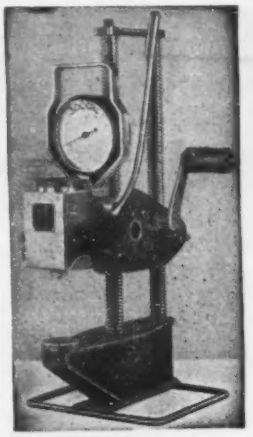

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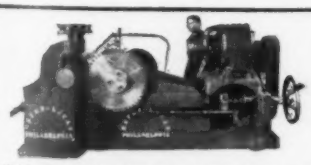

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Especially geared for light to medium heavy stampings and high volume runs of small, intricate "Multi-Stampings." We invite your inquiry or write for Stamping Brochure.

good machinery

REBUILT

to exacting standards

16" x 78" centers PRATT & WHITNEY Toolroom Lathe, taper attachment, collets, chucks, new 1943
27" x 12' centers LODGE & SHIPLEY Selective Geared Head Lathe, AC-MD
28" x 15' centers BERTRAM (Niles patterns) Timesaver Engine Lathe, 2 carriages, rapid traverse, AC-MD, 1943
36" x 12" centers AMERICAN Heavy Duty 16 Speed Geared Head Lathe, AC-MD
42" x 96" centers NILES Timesaver Heavy Duty Lathe, 42" swing over ways, rapid traverse, anti-friction head, AC-MD
60" x 20" NILES BEMENT POND Geared Head Engine Lathe, rapid traverse
No. 1A WARNER & SWASEY Universal Turret Lathe, Timken spindle, electric chuck
No. 3A WARNER & SWASEY Turret Lathe, Timken spindle, electric chuck, tooling
3¾" bar LUCAS Table Type Horizontal Boring Mill, vertical milling attachment, power rapid traverse, AC-MD
No. 2CH KEARNEY & TRECKER Vertical Mill, 1951
No. 2H KEARNEY & TRECKER Horizontal Milling Machine, new 1945
No. 2 VAN NORMAN Plain Horizontal, New 1943
No. 3-24 CINCINNATI Plain Hydromatic Mill, AC-MD
No. 4 CINCINNATI High Speed Dial Type Plain Horizontal Mill, new 1943
No. 4 CINCINNATI Dual Power Vertical Mill, 1951
No. 4H KEARNEY & TRECKER Vertical Mill, new 1944
25A HEALD Rotary Surface Grinder, 24" diameter magnetic chuck, AC-MD
No. 6G SELLERS Drill Grinder, AC motor, late type
16/40" x 120" NORTON Gap Grinder, new 1942
1½" LANDIS Bolt Threader, leadscrews, AC-MD
600 Ton CHAMBERSBURG Wheel Press, cast steel frame, inclined, AC-MD
30" MORTON, Hydraulic Keyseater, new 1942
48" x 48" x 12' NILES Double Housing Planer, 2 rail heads, 1 side head, power rapid traverse
3'-9" column AMERICAN Radial Drill, box table, 1943
48" widened to 69" x 12' DETRICK & HARVEY Double Housing Planer, box table, DC reversing motor drive
48" x 48" x 12' CINCINNATI Double Housing Planer, power rapid traverse, DC reversing motor drive, box table
No. 30A QUICKWORK Rotary Shear, 5/16" capacity, 36" throat, new 1944

We Can Arrange Time Payments or Rentals With Option to Purchase

O'Connell
MACHINERY CO.
of BUFFALO, n. y.
1693 GENESEE ST.

The Clearing House

NEWS OF USED AND REBUILT MACHINERY

Salvage Operation . . . Used and rebuilt equipment dealers are frequently called in to salvage the wreckage resulting from poor business judgment. In one recent case of a firm that has been forced out of business, the dealer handling the transaction believes he has a good chance of recovering enough cash to pay off the firm's creditors and get the owners out from under as well.

The property being put on the block is a modern tool and die shop equipped with new machinery. Life of this firm was extremely brief, since it started in business only last summer.

Although this company has business on the books, it is being forced to close down because the owners made one important mistake. They tried to start the firm without sufficient capital. As a result, they are being pressed by creditors and realize the only possible solution is to sell out.

Won't Cost Too Much . . . The dealer handling the sale believes he can find a buyer to take over the business as a going concern and at the same time get the present owners off the hook without their losing too much.

This case, of course, is not the first time a dealer has sat in on the wake of a potentially flourishing business. It does, however, emphasize importance of the industry apart from its primary function of making used and rebuilt equipment available.

Mine Slump Hurts . . . In the Pittsburgh area electrical equipment business is still off. Slow times in the coal mines and more conservative buying by steel mills have been a severe blow to the electrical equipment dealers.

Despite the dip in the steel ingot rate, however, steel mill equipment dealers say business is brisk and report a large volume of inquiries.

New Philadelphia Firm . . . Thomas O'Brien recently established Republic Machinery Co., 134 North 3rd St., Philadelphia. The firm will purchase, sell and lease all types of machine tools and metalworking equipment.

Mr. O'Brien was formerly vice-president of O'Brien Machinery Co., Philadelphia, and during World War II and the Korean War served on advisory committees for OPA, OPS and NPA. He is now first vice-president of the Machinery Dealers' National Assn. Associated with Mr. O'Brien at Republic is Donald Duncan, former assistant vice-president of O'Brien Machinery Co., and current chairman of the MDNA Philadelphia Chapter.

AT A MEETING in Detroit earlier this month, board of directors of the Machinery Dealers National Assn. passed a proposal for an institutional advertising campaign and approved membership applications from 11 firms.